



**NATIONAL QUALIFICATION**

**15UY0206-4**

**ELECTRO-MECHANIC INSTALLATION WORKER**

**LEVEL 4**

**REVISION NO: 00**  
**AMENDMENT NO: 01**

**VOCATIONAL QUALIFICATIONS AUTHORITY**

**Ankara, 2015**

## PREFACE

**Electro-Mechanic Installation Worker (Level 4)** National Qualification has been developed in accordance with the provisions of the "Regulation on Vocational Qualification, Testing and Certification" issued pursuant to the Vocational Qualifications Authority (VQA) Law No. 5544.

The qualification template was prepared by the Turkish Employers' Association of Metal Industries (MESS) assigned with the protocol signed on 06.11.2012. The opinions of the relevant institutions and organizations in the sector were taken about the template prepared, and the necessary regulations on the template were made by assessing those opinions. Following the review and evaluation by the Electric-Electronic Sector Committee of VQA and the consent of the Committee, the final template was approved by the decree of the VQA Executive Board dated 25.03.2015 and no 2015/15, and placed in the National Qualifications Framework (NQF).

**Electro-Mechanic Installation Worker (Level 4)** National Qualification has been amended by the Presidential Decree dated 10.06.2020 and no. 1570.

We would like to extend our gratitude to people, institutions, and organizations, which presented their opinions and contributed to the development, review, and verification of the qualification, for their contributions and opinions, and we submit the qualification for all parties' information who may benefit from it.

Vocational Qualifications Authority

## INTRODUCTION

The basic criteria for the development of the national qualification, its review by the sector committees, and its approval and enforcement by the VQA Executive Board are stated in the Vocational Qualification, Testing, and Certification Regulation.

National qualifications include the following elements:

- a) The name and level of the qualification,
- b) The purpose of the qualification,
- c) Occupational standard, occupational standard units/tasks or qualification units that constitute the source of qualification,
- ç) Requirements for entering the qualification exam,
- d) Learning outcomes and performance criteria on the basis of qualification units,
- e) Assessment, evaluation and evaluator criteria to be applied in awarding the qualification,
- f) The validity period of the qualification certificate, the conditions for renewal, and the conditions concerning the supervision of the certificate holder.
- g) The institution/organization that developed the qualification and the Sector Committee that validates it.

National qualifications are formed on the basis of national occupational standards and/or international occupational standards.

National qualifications are formulated by the organizations below and through their joint efforts;

- Formal and informal education and training institutions,
- Authorized awarding bodies,
- Organizations that have made a preliminary application for authorization to the Authority,
- Organizations that have developed national occupational standards,
- Occupational organizations.

## 15UY0206-4 ELECTRO-MECHANICAL INSTALLATION WORKER (LEVEL 4) NATIONAL QUALIFICATION

1	<b>NAME OF THE QUALIFICATION UNIT</b>	Electro-Mechanical Installation Worker
2	<b>REFERENCE CODE</b>	15UY0206-4
3	<b>LEVEL</b>	4
4	<b>PLACE IN THE INTERNATIONAL CLASSIFICATION</b>	ISCO 08: 8212 (Electrical and electronic equipment assemblers) ISCO 08: 8211 (Mechanical machinery assemblers)
5	<b>TYPE</b>	-
6	<b>CREDIT VALUE</b>	-
7	<b>A) PUBLICATION DATE</b>	25.03.2015
	<b>B) REVISION / AMENDMENT NO</b>	Revision No: 00 Amendment No: 01
	<b>C) REVISION / AMENDMENT DATE</b>	Amendment No. 01 10/06/2020-1570
8	<b>AIM</b>	<p>Supplying qualified personnel to the organizations/institutions that will carry out the assembly operations of electrical, electro-mechanical, or electronic devices and machines with appropriate tools, equipment, and materials and for these activities to be carried out by trained and skilled persons, and increasing the quality of the works towards the following purposes;</p> <ul style="list-style-type: none"> <li>• Defining the qualifications, knowledge, skills, and competencies that the candidates should possess,</li> <li>• Enabling candidates to prove their vocational qualification with a valid and reliable certificate,</li> <li>• Providing a reference and resource for the education system, and the testing and awarding bodies.</li> </ul>
9	<b>OCCUPATIONAL STANDARD(S) THAT FORM(S) THE BASIS FOR THE QUALIFICATION UNIT</b>	10UMS0096-4 Electro-Mechanical Installation Worker (Level 4) National Occupational Standard
10	<b>REQUIREMENT(S) FOR ENTERING THE QUALIFICATION EXAM</b>	-
11	<b>STRUCTURE OF QUALIFICATION</b>	
	<b>11-a) Mandatory Units</b>	
		15UY0206-4 A1) Occupational Health and Safety, Quality and Environmental Management Systems 15UY0206-4 A2) Work Organization, Preliminary Preparation Procedures 15UY0206-4/A3 Installation and Setting Procedures
	<b>11-b) Elective Units</b>	
		-

<b>11-c) Alternatives for Grouping Units and Additional Learning Outcomes</b>		
The candidate must succeed in all of the compulsory qualification units to receive the qualification certificate.		
<b>12</b>	<b>ASSESSMENT AND EVALUATION</b>	
<p>The candidates who want to achieve an Electro-Mechanical Installation Worker (Level 4) Vocational Qualification Certificate are subjected to theoretical and practical exams defined under relevant units. In order for the candidates to achieve the qualification certificate, they must succeed in both theoretical and practical exams.</p> <p>Theoretical and practical exams in the qualification units can be held separately or jointly for each unit. However, each unit must be assessed independently.</p> <p>The validity period of qualification units is 2 years from the date of achievement of the unit. In order to achieve a qualification by combining the qualification units, all units must remain valid.</p>		
<b>13</b>	<b>VALIDITY PERIOD OF THE CERTIFICATE</b>	The validity period of the qualification certificate is 5 years.
<b>14</b>	<b>OBSERVANCE FREQUENCY</b>	-
<b>15</b>	<b>ASSESSMENT AND EVALUATION METHOD TO BE USED IN CERTIFICATE RENEWAL</b>	<p>At the end of the validity period of five (5) years, the performance of the certificate holder shall be assessed using at least one of the methods defined below;</p> <p>a) Submitting records indicating that they worked in the relevant field for at least two years in total or for the last six months within the 5-year document validity period (such as service transcript, reference letter, contract, invoice, portfolio),</p> <p>b) Taking the practical exams defined for the qualification units within the scope of qualification.</p> <p>a) For the candidates with a positive assessment result, the validity period of the certificate shall be extended for another 5 years.</p>
<b>16</b>	<b>ORGANIZATION(S) DEVELOPING THE QUALIFICATION</b>	TURKISH EMPLOYERS' ASSOCIATION OF METAL INDUSTRIES (MESS)
<b>17</b>	<b>SECTOR COMMITTEE VERIFYING THE QUALIFICATION</b>	VQA ELECTRIC AND ELECTRONICS SECTOR COMMITTEE
<b>18</b>	<b>VQA EXECUTIVE BOARD'S APPROVAL DATE and NUMBER</b>	25.03.2015 - 2015/15

**15UY0206-4/A1 OCCUPATIONAL HEALTH AND SAFETY, QUALITY AND ENVIRONMENT  
MANAGEMENT SYSTEMS QUALIFICATION UNIT**

<b>1</b>	<b>NAME OF THE QUALIFICATION UNIT</b>	Occupational Health and Safety, Quality and Environmental Management and
<b>2</b>	<b>REFERENCE CODE</b>	15UY0206-4/A1
<b>3</b>	<b>LEVEL</b>	4
<b>4</b>	<b>CREDIT VALUE</b>	-
<b>5</b>	<b>A) PUBLICATION DATE</b>	25.03.2015
	<b>B) REVISION / AMENDMENT NO</b>	Revision No: 00 Amendment No: 01
	<b>C) REVISION / AMENDMENT DATE</b>	Amendment No. 01 10/06/2020-1570
<b>6</b>	<b>THE OCCUPATIONAL STANDARD BASIS FOR THE QUALIFICATION UNIT</b>	
10UMS0096-4 Electro-Mechanical Installation Worker (Level 4) National Occupational Standard		
<b>7</b>	<b>LEARNING OUTCOMES</b>	
<p><b><u>Learning Outcome 1: Defines occupational health and safety, fire and emergency rules.</u></b>  <b>Performance Criteria:</b>            1.1: Lists the legal obligations and workplace rules on occupational health and safety.            1.2: Defines emergency procedures in case of hazards.            1.3: Lists emergency exit procedures.</p> <p><b><u>Learning Outcome 2: Has knowledge of environmental protection legislation and practices.</u></b>  <b>Performance Criteria:</b>            2.1: Knows environmental protection standards and methods.            2.2: Contributes to the reduction of environmental risks.</p> <p><b><u>Learning Outcome 3: Has knowledge of the quality management system documents and practices.</u></b>  <b>Performance Criteria:</b>            3.1 : Knows the quality requirements of the job.            3.2 : Lists the technical procedures for ensuring quality.            3.3 : Keeps under control the quality of the work performed.</p>		
<b>8</b>	<b>ASSESSMENT AND EVALUATION</b>	
<b>8 a) Theoretical Exam</b>		
<p>The theoretical exam for the A1 unit shall be applied as per the "Information" checklist in Annex A1-2. In the theoretical exam, candidates should take a written exam consisting of at least 20 four-option multiple-choice questions, each one with an equal point value. No points shall be deducted for wrong answers in the exam consisting of multiple-choice questions. Candidates shall be given an average time of one minute per question during the exam.</p> <p>A candidate who answers at least 70% of the questions correctly in the written exam shall be deemed successful. The questions in the exam should measure all knowledge statements (ANNEX A1-2) intended to be measured by the theoretical exam in this unit.</p>		
<b>8 b) Practical Exam</b>		
<p>Practical assessment and evaluation for OHS, Environment and Quality will be conducted during the practical exams of other units.</p>		

<b>8 c) Other Conditions Regarding Assessment and Evaluation</b>		
The validity period of the exams foreseen for the unit shall be 1 year from the date of achievement of the exam. In order to achieve the unit, the time between achieved exam dates cannot exceed one year. The validity period of qualification units is 2 years from the date of achievement of the unit. If the candidate displays behavior that could jeopardize their own safety and the safety of others, the exam shall be terminated.		
<b>9</b>	<b>INSTITUTION/ORGANIZATION(S) DEVELOPING THE QUALIFICATIONS UNIT</b>	TURKISH EMPLOYERS' ASSOCIATION OF METAL INDUSTRIES (MESS)
<b>10</b>	<b>SECTOR COMMITTEE VERIFYING THE QUALIFICATION UNIT</b>	VQA Electric and Electronics Sector Committee
<b>11</b>	<b>VQA EXECUTIVE BOARD'S APPROVAL DATE and NUMBER</b>	25.03.2015 - 2015/15

### QUALIFICATION UNIT ANNEXES

#### ANNEX [A1] - 1: Information on Recommended Training for the Acquisition of the Qualification Unit

Candidates shall be recommended to complete a program with the below-described training content for this unit.

#### **Training Content:**

1. Emergency
2. Alarm signals and danger signs
3. Environment and environmental pollution
4. Teamwork
5. Recyclable waste
6. Occupational health and safety
7. Task documentation
8. Quality assurance/management systems
9. Keeping records
10. Protection, recovery, first aid and fire
11. Measurement methods
12. Planning methods
13. Social problem solving
14. Risk and hazard analysis
15. Hazardous waste
16. Basic first aid
17. Environmental risks arising from production
18. Fire and fire protection
19. Time management

#### ANNEX [A1]-2: Checklist to be Used in the Assessment and Evaluation of the Qualification Unit

##### a) INFORMATION

No.	Knowledge Statement	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
INFO.1	Lists the risks that will affect occupational health and safety and the measures that need to be taken.	A.1.1	1.1	T1
INFO.2	Has knowledge of safe storage of flammable and combustible materials.	A 1.5	1.1	T1
INFO.3	Explains the notifications to be made in emergency situations as specified in the safety instructions.	A.4.2	1.3	T1
INFO.4	Explains emergency procedures specific to the devices used and the task performed.	A.3.3	1.2	T1
INFO.5	Explains the procedures for detecting the environmental impacts related to the conducted tasks.	B.1.2	2.1	T1
INFO.6	Explains the sorting and classification processes required for the recovery of recyclable materials.	B.2.1	2.2	T1
INFO.7	Keeps ready the appropriate equipment to be used against spills and leaks.	B.2.4	2.2	T1
INFO.8	Describes how to comply with the quality requirements according to the instructions and plans in the task forms.	C.1.1	3.1	T1
INFO.9	Fills in the quality and loss/error forms for the work.	C.2.3	3.2	T1
INFO.10	Notifies the supervisors of errors and malfunctions detected during operation.	C.4.1	3.3	T1



## 15UY0206-4/A2 WORK ORGANIZATION, PRELIMINARY PREPARATION OPERATIONS QUALIFICATION UNIT

1	<b>NAME OF THE QUALIFICATION UNIT</b>	Work Organization, Preliminary Preparation Procedures
2	<b>REFERENCE CODE</b>	15UY0206-4/A2
3	<b>LEVEL</b>	4
4	<b>CREDIT VALUE</b>	-
5	<b>A) PUBLICATION DATE</b>	25.03.2015
	<b>B) REVISION / AMENDMENT NO</b>	Revision No: 00 Amendment No: 01
	<b>C) REVISION / AMENDMENT DATE</b>	Amendment No. 01 10/06/2020-1570
6	<b>THE OCCUPATIONAL STANDARD BASIS FOR THE QUALIFICATION UNIT</b>	
10UMS0096-4 Electro-Mechanical Installation Worker (Level 4) National Occupational Standard		
7	<b>LEARNING OUTCOMES</b>	
<p><b><u>Learning Outcome 1: Organizes the workplace.</u></b>  <b>Performance Criteria</b>  1.1 : Determines the properties of the workplace.  1.2 : Prepares the necessary machines, equipment and materials for work.  1.3 : Cleans equipment and work area at the end of the work.</p> <p><b><u>Learning Outcome 2: Performs preventive and instructed maintenance of tools and equipment.</u></b>  <b>Performance Criteria</b>  2.1: Checks the operability status of the work equipment.  2.2: Applies the maintenance procedures for the work equipment.  2.3: Conveys information about the wear and tear status of the equipment.</p> <p><b><u>Learning Outcome 3: Prepares assembly components and parts.</u></b>  <b>Performance Criteria</b>  3.1 : Performs the work organization.  3.2 : Prepares tools, equipment and materials.  3.3: Prepares the parts to be assembled.</p> <p><b><u>Learning Outcome 4: Follows the OHS and environment requirements.</u></b>  <b>Performance Criteria:</b>  4.1 : Follows the OHS rules in the works carried out.  4.2 : Considers the environmental effects and quality of the works performed.</p>		
8	<b>ASSESSMENT AND EVALUATION</b>	
<b>8 a) Theoretical Exam</b>		
<p>The theoretical exam for the A2 unit shall be applied as per the "Information" checklist in Annex A2-2. In the theoretical exam, candidates should take a written exam consisting of at least 10 four-option multiple-choice questions, each one with an equal point value. No points shall be deducted for wrong answers in the exam consisting of multiple-choice questions. Candidates shall be given an average time of one minute per question during the exam. A candidate who answers at least 70% of the questions correctly in the written exam shall be deemed successful. The questions of the exam should cover all knowledge statements (Annex A2-2) intended to be assessed by the theoretical exam in this unit.</p>		

<b>8 b) Practical Exam</b>		
The practical exam for the A2 unit is realized as per the "Skills and Competencies" checklist given in Annex A2-2. The critical steps that must be accomplished by the candidate shall be specified in the skills and competencies checklist. In order for a candidate to succeed in the practical exam, they should score at least 80 out of 100 points (80%) in the overall exam, provided that they succeed in all the critical steps. The practical exam shall be carried out in a real or realistically arranged work environment. All expressions of skill and competency (Annex A2-2) should be assessed through the practical exam.		
<b>8 c) Other Conditions Regarding Assessment and Evaluation</b>		
The validity period of the exams foreseen for the unit shall be 1 year from the date of achievement of the exam. In order to achieve the unit, the time between achieved exam dates cannot exceed one year. The validity period of qualification units is 2 years from the date of achievement of the unit. If the candidate displays behavior that could jeopardize their own safety and the safety of others, the exam shall be terminated.		
<b>9</b>	<b>INSTITUTION/ORGANIZATION(S) DEVELOPING THE QUALIFICATIONS UNIT</b>	TURKISH EMPLOYERS' ASSOCIATION OF METAL INDUSTRIES (MESS)
<b>10</b>	<b>SECTOR COMMITTEE CONFIRMING SECTOR COMMITTEE</b>	VQA Electric and Electronics Sector Committee
<b>11</b>	<b>VQA EXECUTIVE BOARD'S APPROVAL DATE and NUMBER</b>	25.03.2015 - 2015/15

### QUALIFICATION UNIT ANNEXES

#### ANNEX [A2]-1: Information on the Recommended Training for the Acquisition of the Qualification Unit

Candidates shall be recommended to complete a program with the below-described training content for this unit.

##### **Training Content:**

1. Filling out information and assessment forms
2. Operation and control procedures
3. Using hardware and instruments
4. Use of handling, carrying and fastening equipment
5. Ability to calculate task times
6. Workplace working procedures
7. Workplace arrangement
8. Soldering techniques
9. Occupational terminology
10. Installation techniques
11. Performing repairs
12. Verbal and written communication
13. Basic electrical knowledge
14. Basic electronic knowledge
15. Basic machine knowledge
16. Basic rivet and spot welding

**ANNEX [A2]-2: Checklist to be Used in the Assessment and Evaluation of the Qualification Unit****a) INFORMATION**

No.	Knowledge Statement	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
INFO.1	Explains the scope of study points by observing the work area for the uninterrupted and proper continuation of work.	D.1.1	1.1	T1
INFO.2	Explains the arrangements to be made according to the type of work and the work method used.	D.1.3	1.1	T1
INFO.3	Lists the methods for preparing the process forms regarding the materials to be used and the methods related to the work to be performed.	D.2.1	1.2	T1
INFO.4	Explains the control and inspection tools and devices to be used during tasks.	D.2.2	1.2	T1
INFO.5	Observes occupational safety conditions while cleaning.	D.3.2	1.3	T1
INFO.6	Knows whether the electrical and mechanical connections of the working equipment are correct and appropriate.	E.1.1	2.1	T1
INFO.7	Checks whether the measurement and inspection instruments are calibrated systematically.	E.2.4	2.2	T1
INFO.8	Determines the wear and tear of the tools and equipment used.	E.3.1	2.3	T1
INFO.9	Provides information about the general and pollution level in the flue.	E.3.3	2.3	T1
INFO.10	Determines the detailed sequence of operations after reading the assembly diagram and technical documents.	F.1.2	3.1.	T1
INFO.11	Determines the safety stock levels of the tools, equipment and materials to be used.	F2.2	3.2.	T1
INFO.12	Separates faulty or defective materials detected during operation.	F.2.5	3.2.	T1
INFO.13	Lists the parts to be used in the assembly process.	F.3.1	3.3.	T1
INFO.14	Explains the processes of inspecting the parts visually, manually and by using measurement tools.	F.3.3	3.3.	T1

**b) SKILLS AND COMPETENCIES**

No	Statement of Skills and Competencies	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
SC.1	Makes an ergonomic arrangement that will provide a conforming work environment.	D.1.4	1.1	P1
SC.2	Prepares the materials to be used in accordance with the operation forms and methods for the works to be performed.	D.2.1	1.2	P1
SC.3	Removes and cleans used equipment at the end of the job.	D.3.3	1.3	P1
SC.4	Informs supervisors and relevant operators about the work performed.	D.3.5	1.3	P1
*SC.5	Periodically checks whether the pressure values, and electrical and mechanical connections of the work equipment are correct and suitable according to the instructions and air temperature.	E.1.1	2.1	P1
SC.6	Periodically checks the functionality of the safety devices according to the instructions.	E.1.1	2.1	P1
SC.7	Stops the operations during work when an incident such as oil leakage, pressure drop, or short circuit occurs or when the possibility of such occurrence is perceived.	E.1.2	2.1	P1
SC.8	Notifies the relevant persons for the replacement or repair of defective equipment and tools.	E.1.3	2.1	P1
SC.9	Implements the necessary maintenance procedures within their authority to ensure the smooth and continuous operation of the equipment.	E.2.1	2.2	P1
SC.10	Performs preventive maintenance and cleaning tasks.	E.2.2	2.2	P1
SC.11	Reports adverse incidents such as wear and tear on the tools and equipment to the relevant supervisor.	E.3.2	2.3	P1
*SC.12	Determines the detailed sequence of operations after reading the assembly diagram and technical documents.	F.1.2	3.1	P1
*SC.13	Prepares the parts to be assembled.	F.1.3	3.1	P1
SC.14	Fills out the forms related to the processes.	F.1.4	3.1	P1
SC.15	Ensures that the necessary tools, equipment and materials are brought from the storage.	F.2.1	3.2	P1
SC.16	Checks the safety stock levels of the manometer.	F2.2	3.2	P1
*SC.17	Checks whether the tools, equipment and materials to be used are operational.	F.2.4	3.2	P1
*SC.18	Determines the necessary settings and preparation processes of the parts to be assembled using technical documents.	F.3.2	3.3	P1
SC.19	Checks the parts visually, manually, and by using measuring devices.	F.3.3	3.3	P1

No	Statement of Skills and Competencies	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
SC.20	Makes simple setting adjustments on the parts to be assembled.	F.3.5	3.3	P1
*SC.21	Uses work clothing and personal protective equipment	A.1.2	4.1	P1
*SC.22	Places the warnings and plates of the work performed.	A.1.4	4.1	P1
*SC.23	Ensures temporary storage of dangerous and hazardous wastes by taking the necessary measures.	B.2.2	4.2	P1
*SC.24	Describes how to comply with the quality requirements allowed in the application	C.1.1	4.2	P1
*SC.25	Applies the quality requirements according to the tolerances and deviations allowed in the application	C.1.2	4.2	P1

(\* ) Critical steps that must be accomplished in the practical exam.

**15UY0206-4/A3 INSTALLATION AND SETTING PROCEDURES QUALIFICATION UNIT**

<b>1</b>	<b>NAME OF THE QUALIFICATION UNIT</b>	Installation and Setting Procedures
<b>2</b>	<b>REFERENCE CODE</b>	15UY0206-4/A3
<b>3</b>	<b>LEVEL</b>	4
<b>4</b>	<b>CREDIT VALUE</b>	-
<b>5</b>	<b>A) PUBLICATION DATE</b>	25.03.2015
	<b>B) REVISION / AMENDMENT NO</b>	Revision No: 00 Amendment No: 01
	<b>C) REVISION / AMENDMENT DATE</b>	Amendment No. 01 10/06/2020-1570
<b>6</b>	<b>THE OCCUPATIONAL STANDARD BASIS FOR THE QUALIFICATION UNIT</b>	
10UMS0096-4 Electro-Mechanical Installation Worker (Level 4) National Occupational Standard		
<b>7</b>	<b>LEARNING OUTCOMES</b>	
<b><u>Learning Outcome 1: Completes the necessary preparations at the assembly area.</u></b>		
<b>Performance Criteria:</b>		
1.1 : Performs preliminary checks.		
1.2 : Checks the assembled parts in previous operations.		
1.3 : Takes protective measures.		
<b><u>Learning Outcome 2: Performs assembly operations.</u></b>		
<b>Performance Criteria:</b>		
2.1: Ensures that the parts are suitable to be assembled.		
2.2: Performs mechanical connections.		
2.3: Makes electronic / electrical connections.		
2.4: Performs finishing operations.		
<b><u>Learning Outcome 3: Performs post-installation inspection, setting and reporting operations.</u></b>		
<b>Performance Criteria:</b>		
3.1: Performs measurement and inspection operations.		
3.2: Adjusts the product or parts.		
3.3: Eliminates malfunctions in the product or parts.		
3.4: Performs reporting operations.		
3.5: Participates in professional development activities.		
<b><u>Learning Outcome 4: Follows the OHS and environment requirements.</u></b>		
<b>Performance Criteria:</b>		
4.1 : Follows the OHS rules in the works carried out.		
4.2 : Considers the environmental effects and quality of the works performed.		
<b>8</b>	<b>ASSESSMENT AND EVALUATION</b>	
<b>8 a) Theoretical Exam</b>		
The theoretical exam for the A3 unit shall be applied as per the "Information" checklist in Annex A3-2. In the theoretical exam, candidates should take a written exam consisting of at least 10 four-option multiple-choice questions, each one with an equal point value. No points shall be deducted for wrong answers in the exam consisting of multiple-choice questions. Candidates shall be given an average time of one minute per question during the exam. A candidate who answers at least 70% of the questions correctly in the written exam shall be deemed successful. The questions of the exam should cover all knowledge statements (Annex A3-2) intended to be assessed by the theoretical exam in this unit.		

<b>8 b) Practical Exam</b>		
The practical exam for the A3 unit shall be applied as per the "Skills and Competencies" checklist in Annex A3-2. The critical steps that must be accomplished by the candidate shall be specified in the skills and competencies checklist. In order for a candidate to succeed in the practical exam, they should score at least 80 out of 100 points (80%) in the overall exam, provided that they succeed in all the critical steps. The practical exam shall be carried out in a real or realistically arranged work environment. All skill and competency statements (Annex A3-2) should be assessed through a practical exam.		
<b>8 c) Other Conditions Regarding Assessment and Evaluation</b>		
The validity period of the exams foreseen for the unit shall be 1 year from the date of achievement of the exam. In order to achieve the unit, the time between achieved exam dates cannot exceed one year. The validity period of qualification units is 2 years from the date of achievement of the unit. If the candidate displays behavior that could jeopardize their own safety and the safety of others, the exam shall be terminated.		
<b>9</b>	<b>INSTITUTION/ORGANIZATION(S) DEVELOPING THE QUALIFICATIONS UNIT</b>	TURKISH EMPLOYERS' ASSOCIATION OF METAL INDUSTRIES (MESS)
<b>10</b>	<b>SECTOR COMMITTEE CONFIRMING SECTOR COMMITTEE</b>	VQA Electric and Electronics Sector Committee
<b>11</b>	<b>VQA EXECUTIVE BOARD'S APPROVAL DATE and NUMBER</b>	25.03.2015 - 2015/15

### QUALIFICATION UNIT ANNEXES

#### ANNEX / A3-1: Information on Recommended Training for Acquisition of the Qualification Unit

Candidates shall be recommended to complete a program with the below-described training content for this unit.

#### Training Content:

1. Filling out information and assessment forms
2. Operation and control procedures
3. Circuit elements
4. Using hardware and instruments
5. Manual skill
6. Handling, carrying and fixing equipment
7. Ability to calculate task times
8. Workplace-specific legislation and working procedures
9. Control and application techniques
10. Control circuit elements
11. Soldering techniques
12. Material and process identification codes
13. Occupational terminology
14. Assembly diagrams and sketches
15. Installation techniques
16. The order of performing the repair operations
17. Measuring and inspection tools
18. Verbal and written communication
19. Basic electrical knowledge
20. Basic knowledge of electrohydraulic and electro-pneumatic

21. Basic electronic knowledge
22. Basic machine knowledge
23. Basic rivet and spot welding
24. Time management

## ANNEX [A3]-2: Checklist to be Used in the Assessment and Evaluation of the Qualification Unit

### a) INFORMATION

No.	Knowledge Statement	NVS Relevant Department	Qualification Unit Performance Criteria:	Assessment Tools
INFO.1	Uses measuring devices and determines the conformity of the places where assembly processes will take place.	G.1.2	1.1	T1
INFO.2	Determines the sequence of operations by examining the assembly diagrams.	G.1.3	1.1	T1
INFO.3	Obtains information from technical documents about parts to be assembled and parts assembled in previous operations.	G.2.1	1.2	T1
INFO.4	Determines the parts, areas, materials, or apparatus that need to be protected according to the technical instructions.	G.3.2	1.3	T1
INFO.5	Knows how to adjust the mechanical connections on the part to be assembled according to the technical document.	H.2.1	2.2	T1
INFO.6	Identifies the necessary measures to be taken to prevent assembly materials and parts from getting damaged.	H.2.2	2.2	T1
INFO.7	Identifies the situations that may constitute an impediment to the work during the operations.	H.4.4	2.4	T1
INFO.8	Compares the inspection results with the specifications in the technical documents.	I.1.3	3.1	T1
INFO.9	Determines the adjustments to be made by using the setting diagram of the product or part.	I.2.1	3.2	T1
INFO.10	Detects the malfunctions by evaluating the technical drawings, diagrams or sketches of the product or part	I.3.1	3.3	T1
INFO.11	Knows how to fill in necessary forms and documents regarding completed assemblies.	I.4.1	3.4	T1

### b) SKILLS AND COMPETENCIES

No.	Statement of Skills and Competencies	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
SC.1	Prepares the assembly according to the sequence of operations determined in the assembly diagrams.	G.1.3	1.1	P1
SC.2	Checks utility connections such as electricity, water, gas, compressed air and air temperature.	G.1.5	1.1	P1



No.	Statement of Skills and Competencies	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
SC.3	Reports unfavorable, faulty or problematic situations to their supervisors.	G.1.6	1.1	P1
SC.4	Obtains information from technical documents about parts to be assembled and parts assembled in previous operations.	G.2.1	1.2	P1
* SC.5	Checks the conformity of the parts to the dimensional properties by use of appropriate measuring instruments.	G.2.2	1.2	P1
SC.6	Checks the mechanical and electrical conformity of the parts and air temperature.	G.2.3	1.2	P1
SC.7	Rectifies problems, errors and deficiencies within their authority	G.2.4	1.2	P1
SC.8	Notifies the supervisors of any situations that are not within the scope of their authority.	G.2.5	1.2	P1
SC.9*	Observes and evaluates the indicators and warning signs on the assembly line/table.	G3.1	1.3	P1
SC.10	Applies the determined methods to prevent damage to parts, materials or apparatus.	G.3.3	1.3	P1
* SC.11	Inserts the part according to the assembly diagram.	H.1.2	2.1	P1
SC.12	Fixes the part in its original position in accordance with the technical documentation.	H.1.3	2.1	P1
SC.13	Adjust the mechanical connections on the parts to be assembled in accordance with the technical documents.	H.2.1	2.2	P1
SC.14	Ensures the part is placed into its original position according to the technical documents.	H.2.3	2.2	P1
SC.15	Ensures that the assembly processes are completed at the determined speed and schedule.	H.2.4	2.2	P1
SC.16	Makes the electronic/electrical connections of the installed parts.	H.3.1	2.3	P1
SC.17	Connects fixed fasteners by using methods such as soldering, rivets, spot welding.	H.3.3	2.3	P1
SC.18	Makes connections that can be disassembled and reassembled accumulated in the horizontal line.	H.3.4	2.3	P1
SC.19	Follows the schedule required by the job in order to work in accordance with the production speed in the assembly process.	H.4.1	2.4	P1
SC.20	Performs cleaning operations on mechanical connections in accordance with technical instructions.	H.4.2	2.4	P1
* SC.21	Separates the tools, equipment and apparatus used during the assembly process from the part.	H.4.3	2.4	P1
SC.22	Identifies and intervenes with the situations that may constitute an impediment to the work during the operations within the scope of their authority.	H.4.4	2.4	P1
SC.23	Notifies their superiors of situations that are not within their authority but hinders the work during the processes.	H.4.4	2.4	P1

No.	Statement of Skills and Competencies	NVS Relevant Department	Qualification Unit Performance Criteria	Assessment Tool
SC.24	Checks the product or parts and their connections by using measurement and inspection methods.	I.1.1	3.1	P1
SC.25	Checks any incidents that may pose a danger such as a looseness, leakage, stray electricity.	I.1.2	3.1	P1
SC.26	Compares the inspection results with the specifications in the technical documents.	I.1.3	3.1	P1
* SC.27	Makes the specified setting adjustments on the product or part by using relevant tools and devices.	I.2.2	3.2	P1
SC.28	Checks whether the settings conform the manometer.	I.2.3	3.2	P1
SC.29	Eliminates the failures detected at the end of the work within their authority.	I.3.2	3.3	P1
SC.30	Informs their supervisors about the failures detected at work which are not within their authority.	I.3.3	3.3	P1
SC.31	Works in accordance with the schedule of assembly operations instructions.	I.3.4	3.3	P1
SC.32	Performs inspection operations after the errors are rectified.	I.3.5	3.3	P1
SC.33	Ensures that connections and parts comply with technical instructions.	I.3.6	3.3	P1
SC.34	Ensures that the assembled material is delivered to the relevant department.	I.4.2	3.4	P1
* SC.35	Prepares reports on errors detected by measurement and inspection processes and submits them to their supervisors.	I.4.3	3.4	P1
SC.36	Prepares reports on the adjustments made on the product or parts and submits them to their supervisors.	I.4.4	3.4	P1
SC.37	Shares their knowledge and experiences regarding the job with their coworkers.	J.2.1	3.5	P1
SC.38	Provides limited information and training on electro-mechanical assembly processes.	J.2.2	3.5	P1
*SC.39	Uses work clothing and personal protective equipment suitable for the job.	A.1.2	4.1	P1
*SC.40	Places the warning signs and plates relevant to the performed work in accordance with the instructions.	A.1.4	4.1	P1
*SC.41	Ensures temporary storage of dangerous and hazardous wastes by taking the necessary measures.	B.2.2	4.2	P1
*SC.42	Describes how to comply with the quality requirements allowed in the application.	C.1.1	4.2	P1
*SC.43	Applies the quality requirements according to the tolerances and deviations allowed in the application.	C.1.2	4.2	P1

(\* ) Critical steps that must be accomplished in the practical exam.

## QUALIFICATION ANNEXES

### **ANNEX 1: Qualification Units**

15UY0206-4/A1 Occupational Health and Safety, Quality and Environmental Management Systems

15UY0206-4/A2 Work Organization, Preliminary Preparation Procedures

15UY0206-4/A3 Installation and Setting Procedures

### **ANNEX 2: Terms, Symbols and Abbreviations**

**AMMETER:** An instrument for measuring the current strength passing through a conductor.

**SKILL:** The ability to fulfill duties and responsibilities regarding a specific work,

**ENVIRONMENTAL PROTECTION:** Use of materials or processes that do not harm the environment, in the studies, or disposing of hazardous wastes properly,

**CIRCUIT:** The entire conductive path, which contains many electronic elements such as resistors and transistors, through which electric current flows,

**ELECTROMECHANICS:** Mechanical systems that are operated and controlled by electrical elements.

**HANDLING:** Loading, unloading and debarkation of loads to and from vehicles.

**GALVANOMETER:** A device that works with the principle that the change in electric current creates a magnetic field and measures small currents,

**RECOVERY:** Putting materials back into use and managing the relevant processes, directly or after processing them,

**HYDRAULIC:** The technology that enables the movement and control of systems working with liquid pressure,

**ISCO:** International Standard Classification of Occupations.

**OHS:** Occupational Health and Safety.

**GENERATOR:** A machine that converts mechanical energy into electrical energy,

**CALIBRATION:** The task of comparing a reliable and accurate (traceable) reference measuring device with an unreliable and inaccurate measuring device and reporting the results of measurement, and the corrective action to be taken as per such results.

**PERSONAL PROTECTIVE EQUIPMENT:** All tools, equipment, instruments, and devices that are either worn, put on, or held by workers to protect them against one or multiple risks which may arise during work or which may affect their health and safety.

**TERMINAL BOX:** The device used to attach the conductors to each other,

**CONDENSER:** A device formed by placing an insulating material between two metal layers, in which a current-free electric charge is accumulated,

**SOLDERING:** A weld obtained by melting a metal or alloy that melts easily between metal parts to be joined, used in the process of attaching metals with low melting points,

**ASSEMBLY:** Assembling the parts made of metal, plastic and glass materials to the places specified in the technical documents by using various joining methods, making the necessary adjustments and connections,

**OHMMETER:** An instrument that measures electrical resistance.

**PNEUMATIC:** The technology that enables the movement and control of systems working with compressed gas pressure,

**RISK:** Composition of the probability of occurrence of a dangerous incident and its consequences.

**HAZARD:** A potential source or situation that may cause harm to people or the working area in form of injury, illness, material loss or any combination these.

**TORQUE METER:** The instrument that measures the tightening of various fasteners at appropriate torque values,

**VOLTMETER:** A device for measuring the voltage between any two points of an electrical circuit.

**ANNEX 3:** Pathways to Horizontal and Vertical Advancement in the Occupation

**ANNEX 4:** Evaluator Criteria

- a) Having at least three (3) years of experience in electro-mechanical assembly, graduated from electrical, electronics, machinery, automotive, mechatronics, electrical-electronics, electronic-communication programs of engineering, technology or technical education faculties,
- b) Have graduated from the relevant departments of vocational associate degree schools and having at least five (5) years of experience in the field of electro-mechanical assembly,
- c) Having Electro-Mechanical Installation Worker (Level 4) Vocational Qualification Certificate and having at least nine (9) years of professional experience.

Evaluators, who at least have one of the above-mentioned characteristics and who will participate in the assessment and evaluation process, should be trained in the vocational qualification system, relevant national qualification(s), relevant national occupational standard(s), assessment and evaluation and quality assurance in assessment and evaluation, by institutions authorized in the relevant field.

**ANNEX 5<sup>(\*)</sup>: Institutions/Organizations Contributing to the Qualification Template Before Its Submission to Official Approval**

1. ARÇELİK A.S.
2. MAKO ELEKTRİK SANAYİ VE TİCARET A.S.
3. VALEO OTOMOTİV SİSTEMLERİ ENDÜSTRİSİ A.S.

**ANNEX 6<sup>(\*)</sup>: Institutions and Organizations to which the Qualification Template is Sent for Approval**

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**ANNEX 7<sup>(\*)</sup>: Opinions from Institutions and Organizations on the Qualification Draft and the Form for Assessment of Received Opinions**

Qualification and Level:				
Last Comment Date:				
Title of the Institution/Person That Commented:				
E-Mail:				
Phone:				
Fax:				
<p>This form is used to obtain and evaluate the opinions of the relevant parties on the qualification template in order to increase transparency and participation in the qualification preparation process, as well as to create objective and nationally accepted national qualifications. Opinions can be obtained by sending the form to natural and legal persons who are believed to contribute to the process by duplicating it.</p> <p>Please send the form to our Union's e-mail address <b>egitim@mess.org.tr</b> after completion. Thank you for your comments and contributions.</p>				
No.	Place on qualification (section, line number, page number)	Opinions and Recommendations	These two columns will be filled in by the organization submitting the qualification template for comments.	
			Assessment	Edit on the qualifications:
1				
2				

**ANNEX 8<sup>(\*)</sup>:** Information on the Pilot Study Carried out to Determine the Criteria to be Applied in Acquiring the Qualification

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**ANNEX 9<sup>(\*)</sup>:** Explanations on Entry Prerequisites for the Qualification Exam and the Certificate Validity Period

Professional certification for equivalent/parallel occupations in Turkey and EU countries

In line with the evaluation of the validity periods of the applications and the enterprises operating in the relevant sector in our country, the validity period of the certificate has been determined as 5 years.