



NATIONAL QUALIFICATION

12UY0065-3

PAINT PRODUCTION OPERATOR

LEVEL 3

REVISION NO: 01

VOCATIONAL QUALIFICATION AUTHORITY

Ankara, 2012

PREFACE

This reference guide, namely **Paint Production Operator (Level 3) National Qualification** was prepared in accordance with the provisions of the “Regulation on Vocational Qualifications, Testing and Certification” issued pursuant to the Vocational Qualifications Authority (VQA) Law no 5544.

Draft Qualification was prepared by KİPLAS – Turkish Chemical, Petroleum, Rubber, and Plastic Industry Employers’ Association based upon the protocol signed on 07 October 2010. After assessing opinions of the relevant organizations and institutions, the draft has been amended accordingly. The final draft was evaluated by the **VQA’s Chemical, Petroleum, Rubber, and Plastic Industry Committee**, which deemed it suitable. It was approved by the Board of Directors of the VQA through its decision no **2012/49** of **04. 07.2012** and decided to be placed within the National Qualification Framework (NQF).

We would like to extend our gratitude to all people, organizations and institutions that have expressed their opinions and contributed to the preparation, examination and verification processes of the qualification. We would like to offer it to the service of all likely beneficiaries.

Vocational Qualification Authority

INTRODUCTION

The key criteria referred to in the national qualification preparation process, the relevant sector committees' review and the VQA's Board of Directors' approval processes are set in the Regulation on Vocational Qualification, Testing and Certification.

National qualification is defined by,

- a) Name and level of the qualification,
- b) Aim and rationale of the qualification,
- c) Occupational standard, occupational standard units or qualification units which form the basis for the qualification,
- d) Training and experience criteria (form, content, duration etc) necessary for the qualification,
- e) Learning outcomes necessary to acquire the qualification,
- f) Assessment procedures and principles to be applicable to in the acquisition of the qualification, minimum testing materials and assessor criteria necessary for assessment,
- g) Validity of the qualification certificate, renewal conditions, supervision of the certificate holder if deemed necessary,
- h) Institution developing the qualification and Sector Committee verifying the Qualification.

National qualifications are built according to the relevant national occupational standard if there is one or to the relevant international occupational standard if there is none at the national level.

National qualifications are set in cooperation with the below bodies

- Formal and non-formal education and training institutions,
- Authorized Certification Bodies,
- Institutions having pre-applied for certification to the authority,
- Institutions having drawn up national occupational standard,
- Professional organizations.

12UY0065-3 PAINT PRODUCTION OPERATOR (LEVEL 3) NATIONAL QUALIFICATION

1	NAME OF QUALIFICATION	Paint Production Operator
2	REFERENCE CODE	12UY0065-3
3	LEVEL	3 ISCO 08: 8131
4	INTERNATIONAL CLASSIFICATION CODE	
5	TYPE	-
6	CREDIT VALUE	-
7	A) DATE OF PUBLICATION	04. 07.2012
	B) REVISION NO	01
	C) REVISION DATE	03. 04.2013
8	AIM	<p>In the production of paint, which will not be realized through chemical reaction that the paint production operator (level 3) does his profession successfully, efficiently and according to international standards, as to ensure the job satisfaction of employees that the production will be realized completely of good quality and the work will be continued through development.</p> <p>To identify the features, knowledge, skills and competencies, which candidates should have.</p> <p>To enable candidates to prove with a valid and reliable document their professional competence.</p> <p>To provide reference and source to the education system, examination certification authorities.</p>
9	OCCUPATIONAL STANDARD(S) FORMING THE BASIS FOR THE QUALIFICATION	
10UMS0087-3 Paint Production Operator (Level 3) National Vocational Standard		
10	REQUIREMENTS TO TAKE QUALIFICATION TEST	
-		
11	STRUCTURE OF QUALIFICATION	
11-a) Compulsory Units		
12UY0065-3/A1 Occupational Health, Safety, and Environmental Protection		
12UY0065-3/ A2 Paint Production Operations		
11-b) Elective Units		
-		
11-c) Alternatives for Grouping of Units and Additional Learning Outcomes		
-		
12	ASSESSMENT	
Measurement and evaluation will be applied in two stages as to meet all success criteria described in the units.		

1. Theoretical Knowledge exam**2. Performance-Based Practice Examination (monitoring when doing the work)**

The candidate must be successful in the units A1 and A2 in order to get qualification.

The candidate must be successful in the theoretical knowledge examinations in order to be accepted to the Performance-Based Practice Examination

The period of validity of the examination results according to units is one year after the date of examination. The candidate, who fails to pass a unit or section, has the right for re-examination within this period from the failed unit or section. However; candidates who fail to pass the practice exam of occupational health and safety, environmental protection, will be deemed to be unsuccessful from the practice examination of other unit. Candidates, who will be successful from exam of occupational health and safety, environmental protection unit and fail to pass the examinations of other unit, will be exempted from the examinations of occupational health and safety, environmental protection and will be able to take part in the examination of failed unit within one year.

THEORETICAL KNOWLEDGE EXAMINATION

The success of the candidate will be evaluated according level to meet the criteria of assessment of the related unit. The evaluation of each unit will be done separately.

The test questions shall be designed to measure all learning outcomes and performance criteria stipulated to be measured within the scope of the whole theoretical test.

PERFORMANCE-BASED EXAMINATION

Performance-based practice examination will be performed under real production conditions or similar nearest to real conditions. The performance will be evaluated on control lists and/or question lists in format of scenarios, of which parameters to meet success criteria of the unit and points have been defined.

The control lists consist of critical action steps divided into small pieces of the work and the candidates get points at each step. The performance-based practice examinations will be designed as to measure all learning outcomes and success criteria, provided for measurement with the practice examination.

The performance-based practice examinations will be carried out in an integral manner, bur each unit will be evaluated separately. The success of the candidate will be evaluated according level to meet the criteria of assessment of the related unit.

Note: It is expected that the candidates behave according to the rules of occupational health and safety in the performance-based practice exams. Candidates acting contrary to this will be taken out of the exam and it will not be allowed to take part in other stages of the performance-based practice exam.

13	VALIDITY OF CERTIFICATE	The validity period of the qualification certificate is 5 years beginning from the date of issue.
14	FREQUENCY OF SURVEILLANCE	Candidate shall be subject to surveillance by Assessment Institution at least once within validity period of Vocational Qualification Certificate. This supervision is carried out when the authority of the workplace where the certificate owner works approved the supervision and service notification form prepared by certification body. Holder of certificate shall be evaluated being subject to surveillance at least once beginning from the end of second (2 nd) year.
15	ASSESSMENT METHODS TO BE FOLLOWED IN RENEWAL OF EXPIRED CERTIFICATES	Surveillance inspection shall be performed at the end of validity period of the certificate. The candidate should be able to prove s/he has worked in Paint Production Operator (Level 3) Occupation at the least, in this surveillance.

		The period being away from the profession shall not exceed consecutive two (2) years, owners of certificates, whose working period will be evaluated as adequate due to surveillance monitoring, which will be made within the validity period of the certificate (beginning from the 2nd year) and after the end of the validity of the certificate (beginning from the end of 5th year) will be evaluated as adequate. The documents of owners of the documents, which will be deemed adequate, will be extended for additional five years without examination. Persons, who do not realize this document validation procedure within the period mentioned above, can actualize their documents by taking part and passing the examination, which is defined in the document evaluation system. In order to extend the validity of the document after the end of the second five year, it is necessary to take part in the measurement and evaluation examination. The documents of those, who will be successful in the examination, will be extended for five years.
16	QUALIFICATION DEVELOPMENT INSTITUTION(S)	KİPLAS – TURKISH CEMICAL, RUBBE, AND PLASTIC INDUSTRY EMPLOYERS UNION ASSOCIATION OF PAINT INDUSTRIALISTS (BOSAD)
17	SECTOR COMMITTEE TO VERIFY QUALIFICATION	VQA CHEMISTRY, PETROLEUM, RUBBER, AND PLASTIC SECTOR COMMITTEE
18	DATE AND NUMBER OF APPROVAL BY VQA BOARD OF DIRECTORS	04. 07.2012/2012-49

12UY00-3 / A1 OCCUPATIONAL HEALTH & SAFETY AND ENVIRONMENTAL PROTECTION QUALIFICATION ITEM

1	NAME OF QUALIFICATION UNIT	Occupational Health and Safety, Environment Protection
2	REFERENCE CODE	12UY0062-3/A1:
3	LEVEL	3
4	CREDIT VALUE	-
5	A) DATE OF PUBLICATION	04. 07.2012
	B) REVISION NO	01
	C) REVISION DATE	03. 04.2013
6	OCCUPATIONAL STANDARD(S) FORMING THE BASIS FOR THE QUALIFICATION	
10UMS0087-3 Paint Production Operator (Level 3) National Vocational Standard		
7	LEARNING OUTCOMES	
<p>Learning Outcome 1: Applies the precautions taken in relation to occupational health and safety.</p> <p>Performance Criteria:</p> <p>1.1: Knows basic concepts relating to the occupation.</p> <p>1.2: Uses the machines, tools and equipments in accordance with instructions and Occupational Health and Safety rules.</p> <p>1.3: Knows and applies the occupation- and workplace-specific occupational health and safety rules, precautions against hazards and risks, and emergency plans correctly.</p> <p>1.4: Carries out all controls and maintenance of personal protective equipment, protection and response vehicles.</p> <p>1.5: Carries out grounding operations in applications having possibility of electrostatic charge and sparking in accordance with instructions.</p> <p>1.6: Applies rules and necessary precautions regarding use of hazardous substances (raw materials and chemicals).</p> <p>1.7: Carries out the first actions in cases of dangerous situations and emergency in accordance with instructions.</p> <p>Learning Outcome 2: Knows and applies necessary precautions against environmental risks.</p> <p>Performance Criteria:</p> <p>2.1: Applies requirements of environmental legislation and occupational standards.</p> <p>2.2: Separates hazardous substances from other wastes and materials and takes required measures.</p> <p>2.3: Contributes to reducing environmental risks and achieving environmental targets.</p> <p>2.4: Behaves in sense of responsibility required by occupation and working conditions.</p> <p>2.5: Uses natural resources efficiently.</p>		
8	ASSESSMENT	
8 a) Theoretical Examination		
<p>T: A question system of multiple-choice will be used. A1 birimi için 10-15 soru sorulur. Each question has equal point. In order to be deemed successful of the candidate, he has to achieve 60% at east. The assessment will be made through correct answers. The examination time per question is 1.5-2 minutes. The exam questions will be designed, as to measure all success criteria in this unit.</p>		
8 b) Performance based Examination		
<p>P: Performance criteria of the Paint Production Operator (Level 3) will be evaluated according to control list, specified as to success criteria in the A1 unit in the application environment. Evaluation will be made on points specified for each step in the control list. To be considered successful of the candidate, he must provide at least 70% success. The performance-based applied examination time should be compatible with that time under real production conditions.</p>		

8 c) Other Assessment related conditions		
The candidate must be successful at both exams described in this unit. The candidate failing theoretical exam of this unit cannot take practical exam. The candidate can take the examination for the parts where he/she failed within 1 year, again. However, in case of having a break more than 1 year, s/he has to take both examinations described in the unit, again.		
9	QUALIFICATION DEVELOPMENT INSTITUTION(S)/ORGANIZATIONS(S)	KIPLAS – TURKISH CEMICAL, RUBBE, AND PLASTIC INDUSTRY EMPLOYERS UNION ASSOCIATION OF PAINT INDUSTRIALISTS (BOSAD)
10	SECTOR COMMITTEE TO VERIFY QUALIFICATION UNIT	VQA CHEMISTRY, PETROLEUM, RUBBER, AND PLASTIC SECTOR COMMITTEE
11	DATE AND NUMBER OF APPROVAL BY VQA BOARD OF DIRECTORS	04. 07.2012/2012-49

ANNEXES

EK A1-1: Information on Recommended Training to Earn a Qualification Unit

Content of Training:

1. Basic concepts, codes, and terms relating to the occupation
2. Knowledge on raw materials, products, machinery, tools, and equipment relating to the occupation.
3. Basic knowledge on working conditions and labor legislation of the occupation
4. Occupational Health and Safety Legislation
 - 4.1: Occupational Health and Safety Instructions
 - 4.2: Safe work with chemicals and material safety data sheet
 - 4.3: Accident Prevention Instructions
 - 4.4: Personal Protective Equipment
 - 4.5: Protection measures in various machines
 - 4.6: Information of treatment and first aid in case of accident
 - 4.7: dangers of electrical current
 - 4.8: Production related environmental hazards
5. Emergency
6. Being sensitive of and protecting the environment
 - 6.1: Environmental and human health
 - 6.2: Environmental pollution
 - 6.3: Waste Management
 - 6.4: Recovery /Recycle
 - 6.5: Environmental problems arising from chemical and paint sectors
 - 6.6: Efficient use of natural resources

12UY0065-3/A2 PAINT PRODUCTION PROCESSES ADEQUACY UNIT

1	NAME OF QUALIFICATION UNIT	Paint production operations
2	REFERENCE CODE	12UY0062-3/A2:
3	LEVEL	3
4	CREDIT VALUE	-
5	A) DATE OF PUBLICATION	04. 07.2012
	B) REVISION NO	01
	C) REVISION DATE	03. 04.2013
6	OCCUPATIONAL STANDARD(S) FORMING THE BASIS FOR THE QUALIFICATION	
10UMS0087-3 Paint Production Operator (Level 3) National Vocational Standard		
7	LEARNING OUTCOMES	
<p>Learning Outcome 1: Applies quality management system. Performance Criteria:</p> <p>1.1: Works according to basic laws and regulations of working life and rules of professional ethics. 1.2: Uses documents related to quality management systems and practices according to the instructions. 1.3: Applies instructions and methods completely to resolve the error and fault. 1.4: States works in written by using the forms defined in the reporting works 1.5: Contributes to the works of development of quality management system relating to his profession.</p> <p>Learning Outcome 2: Does preparation works Performance Criteria:</p> <p>2.1: Does according to elements, of which preliminary preparations have been made. 2.2: Programs his work according to workplace procedures, instructions, the production plan. 2.3: Checks the conformity of, organizes, and makes cleaning of the work environment. 2.4: Makes the necessary checks on raw materials. 2.5: Brings the raw material to the production area in accordance with the production schedule. 2.6: In the water and / or solvent-based production, controls the production conformity of the production means. 2.7: Takes records of materials used and production. 2.8: Pays attention to detect nonconformities, defects and deficiencies, informs relevant departments and supervisors timely</p> <p>Context 1:</p> <p>2.1: Factors to be taken into consideration on preliminary preparation operations: properties of work area to perform the profession, the raw materials used and instructions of other chemicals, machinery, equipment, tools, work orders and prescriptions.</p> <p>Context 2:</p> <p>2.6: Production means and compliance control: control on appropriateness to the production of tanks, valves, skimmers, mixers, weighing, measuring, lifting, transport, ventilation systems, filters, pumps, cooling/heating water and air pressure, in the solvent-based production, control of appropriateness to the production of milling machine, nitrogen tube.</p> <p>Learning Outcome 3: Carries out raw material loading, mixing, control and completing works. Performance Criteria:</p> <p>3.1: Does raw material loading records complete and timely. 3.2: Adds water (in the water-based paint production) or binder (in the production of solvent-based paints) into the vessel according to the instructions of production. 3.3: Loads dispersing agents and powder additives in row and speed as specified in the process detail</p>		

- 3.4:** Does homogenizing and dispersing of the mixture (water and solvent-based) or milling mixture (solvent-based) processes as indicated in the card of manufacturing and process carefully.
- 3.5:** Makes control by taking samples of the mixture.
- 3.6:** Checks the temperature of the mixture.
- 3.7:** Makes the control of dispersion and records the test results and informs related units.
- 3.8:** Makes the mixing as the period specified in the process details.
- 3.9:** Adds binder and liquid ingredients and finishes the procedure by mixing.
- 3.10:** Sends the sample of the product to the competent unit, provides the final examination.

Learning Outcome 4: Does storage and cleaning processes

Performance Criteria:

- 4.1:** Transfers the product controlled to be stored according to the specified procedure
- 4.2:** Makes cleaning of working environment, machinery, tools, supplies and tanks according to the instructions.

8 ASSESSMENT

8 a) Theoretical Examination

T: A question system of multiple-choice will be used. For A2 unit, 30-40 questions will be asked. Each question has equal point. In order to be deemed successful of the candidate, he has to achieve 60% at east. The assessment will be made through correct answers. The examination time per question is 1.5-2 minutes. The exam questions will be designed, as to measure all success criteria in this unit.

8 b) Performance based Examination

P: Performance criteria of the Paint Production Operator (Level 3) will be evaluated according to control list, specified as to success criteria in the A2 unit in the application environment. Evaluation will be made on points specified for each step in the control list. To be considered successful of the candidate, he must provide at least 70% success. The period of the performance-based exam, should be consistent with the actual production conditions. In this unit, all the success criteria to be measured with the practice exam, will be measured by this examination.

8 c) Other Assessment related conditions

The candidate must be successful at both exams described in this unit. The candidate failing theoretical exam of this unit cannot take practical exam. The candidate failing in practice exam of A1 unit is deemed to be unsuccessful in practice exam of A2 unit, as well. The candidate can take the examination for the parts where he/she failed within 1 year, again. However, in case of having a break more than 1 year, s/he has to take both examinations described in the unit, again.

9	QUALIFICATION DEVELOPMENT INSTITUTION(S)/ORGANIZATIONS(S)	KİPLAS – TURKISH CEMICAL, RUBBE, AND PLASTIC INDUSTRY EMPLOYERS UNION
10	SECTOR COMMITTEE TO VERIFY QUALIFICATION UNIT	ASSOCIATION OF PAINT INDUSTRIALISTS (BOSAD) VQA CHEMISTRY, PETROLEUM, RUBBER, AND PLASTIC SECTOR COMMITTEE
11	DATE AND NUMBER OF APPROVAL BY VQA BOARD OF DIRECTORS	04. 07.2012/2012-49

ANNEXES

EK A2-1: Information on Recommended Training to Earn a Qualification Unit

Content of Training:

- 1. BASIC QUALITY MANAGEMENT SYSTEM**
 - 1.1:** Basic principles of total quality management
 - 1.2:** Basic concepts and definitions of quality management system
 - 1.3:** Documentation and reporting in the quality management system
 - 1.4:** Electronic and mechanical measurement tools used in quality assurance,
 - 1.5:** Advertising and informational value of brand, publicity and quality mark
 - 1.6:** Process quality, basic information on preventing errors and faults
- 2. PAINT**
 - 2.1:** Paint and Paint Related Basic Concepts
 - 2.2:** Paint Types and Features
 - 2.3:** Materials comprising the paint
 - 2.4:** Paint Manufacturing Technologies
 - 2.4.1:** Water-based paints
 - 2.4.2:** Solvent-based paints
- 3. WATER-BASED PAINT PRODUCTION**
 - 3.1:** General Information
 - 3.1.1:** Initial Mixing Process
 - 3.1.2:** Dispersion
 - 3.1.3:** Sub-addition process
 - 3.1.4:** Production Equipment
 - 3.2:** Drying mechanisms of paints
 - 3.2.1:** Drying with solvent evaporation
 - 3.2.2:** Drying with chemical reaction
 - 3.3:** Production of water-based paint
 - 3.3.1:** Sample prescriptions
 - 3.3.2:** Properties expected from water-based paint
 - 3.4:** Water-based Paint Production machinery.
 - 3.4.1:** Mixers
 - 3.4.2:** Paint Grinding Machine
 - 3.4.3:** Filtration Machine
 - 3.5:** Specifications of water-based paints
 - 3.5.1:** Flat paint (plastic paint)
 - 3.5.2:** Semi-glosses (Satin paint)
- 4. SOLVENT-BASED PAINT PRODUCTION**
 - 4.1:** Production of solvent-based paints
 - 4.1.1:** Sample prescriptions
 - 4.2:** Specifications of Solvent-based Paint
 - 4.3:** Controls made on wet paint
 - 4.3.1:** Visual inspection
 - 4.3.2:** Viscosity
 - 4.3.3:** Density
 - 4.4:** Solvent based paint production machines
 - 4.4.1:** Dissolvers
 - 4.4.2:** Perl Mills
 - 4.4.3:** Triple cylinders
 - 4.5.:** Specifications of solvent-based paints
- 5. STORAGE OF PAINTS**
 - 5.1:** Transfer Methods
 - 5.2:** Equipment
 - 5.3:** Storage conditions of the paint

QUALIFICATION ANNEXES

ANNEX 1: Qualification Items

- 1) 12UY0065-3/A1 Occupational Health, Safety, and Environmental Protection
- 2) 12UY0065-3/ A2 Paint Production Operations

ANNEX 2: Terms, Symbols and Abbreviations

ABSORBANT: Absorbing chemical substance,

INTERUDE CONTROL: Controlling compliance of dispersion operation,

WASTE: Any substance released into the environment as a result of any activity,

BINDER: Resins connecting pigment pieces and which provide adherence to the surface of the paint,

PAINT TRANSFER: Transfer of the paint to the pipeline for other processes and filling,

PAINT: Final product, which is ready for filling,

SOLUTION: Homogeneous liquid mixture of two or more chemical substances at any rate,

SOLVENT: Liquid or gaseous substances, forming a solution through dissolving solid, liquid or gases,

TARE: The weight of the container of an object weighed in container,

DISPERSOR: Double-walled vessel with mixer and stripper in which the dispersion will be made.

DISPERSION (SUSPENSION): Dispersion, spread; process of dispersion of paint, water particles having very fine solid structures in water or solvent homogeneously.

FILLING MATERIAL: Inorganic material added to the paint to improve covering and flowproperties of the paint.

EQUIPMENT: General name given to dispersants, vessels, tanks, lines, machine tools and supplies used in the manufacture of paints

CRUSH: Homogenising of paint raw material particles.

LINE: Assembly consisting of pipes, pumps and valves providing transfer of paint.

RAW MATERIALS: An industry product or structure used in obtaining the necessary components to obtain the situation before processed.

HOMOGENIZED: Substance in which particles in spread evenly equal to the unit volume.

TANK: Plastic and / or metal container, in which liquid can be put into

HEATING SYSTEM:

1 Assembly heating the water circulating in the vessel, having pipelines and heat exchangers.

2 Conditioning apparatus used in heating the ambient air.

MIXER: The mixing blades rotating in the center of the vessel.

ADDITIVE (AGENT): Materials added into the semi-finished product to impart various properties to the paint.

BOILER JACKET: Metal structure in the boiler to ensure heating and cooling of materials, in which the water can move.

TEMPORARY DEPOT: Depot in production area in which raw materials required for production are temporarily stored

GRINDING: Pelleting of paint raw materials as a result of the physical process.

PARTICLES: The particles, granules.

pH: The acidity-alkalinity level(0-7 acidic, 7 neutral 7-14 basic).

PIGMENT: Paint material forming the color of paint

PROCESS: The production process.

REACTION: Chemical reaction; conversion process of paint by changing of chemical structures of two or more paint materials

RECIPE: Document, on which the amounts required for the manufacture of paints, loading sequence and methods to be used to do other operations is specified

RISK: The danger that causes loss, injury or other harmful results.

IMPURITIES: a certain amount of liquid, gas or solid in materials, which differ from the chemical composition of these substances.

DILUTION (Dilution): Increasing the viscosity.

STRIPPER: Blades returning close to the wall of the vessel and make stripping

SOLVENT: An agent capable of solving liquid.

SOLVENT BASED PAINT: The paint, of which carrier is solvent.

FINAL CHECK: Control operation made before the transfer of the paint

WATER-BASED PAINT: The paint, of which carrier is water.

STATIC ELECTRICITY: The accumulation of electrical charge on the surface of the object.

GRAIN: The small size of the particles forming the raw material of paint

PRODUCT: Produced semi-finished product and finished white paint.

VISCOSITY: Internal friction due to force of attraction in fluids between molecules (cohesion, the resistance to flow.

LOADING: Adding of paint raw materials into the vessel.

ANNEX 3: Ways of Horizontal and Vertical Progress in Occupation

Horizontal progress way of occupation is Paint Filling Operator (Level 3) and Paint Color Adjuster (Level 3).

Vertical progress ways of occupation are Paint Production Operator (Level 4) and Paint Production Operator (Level 5).

ANNEX 4: Assessor Criteria

The assessors, who should have knowledge in measurement, evaluation should meet at least one of the following criteria

1. At least three years experience in the production of paint, having education from one of departments of chemistry, teaching and engineering of chemistry of the universities or have worked as educator.
2. At least five years experience in the production of paint, graduated technician from the departments of chemistry, paint technology of vocational schools of higher education
3. Being graduated from chemistry technology of vocational high schools and having at least seven years experience in the production of paint.