

Qualification Pack



# Lab Chemist/Analyst - Petroleum Products

QP Code: HYC/Q 3901

NSQF Level: 5.5

Hydrocarbon Sector Skill Council  
Second Floor - OIDB Bhawan,  
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## HYC/Q3901 Lab Chemist/Analyst – Petroleum Products

### Brief Job Description

Individual at this job is responsible for analysing samples of oil and gas, perform ASTM/IP/BIS etc test experiments as per defined procedure to determine their composition, quality and value. The person at this job measures the density of liquids, test specific chemical compounds, or perform other tests to identify the physical properties of the substances.

### Personal Attributes

The individual should have good sense of responsibility, a good organizer and time keeper. The person should have the ability to work individually / team in different shift.

### Applicable National Occupational Standards (NOS)

#### Compulsory NOS:

1. HYC/N3901 Testing and analysis of petroleum product
2. HYC/N9301 Working effectively in a team
3. HYC/N9302 Maintain health, safety and security procedures

### Qualification Pack (QP) Parameters

Sector	Hydrocarbon
Sub-Sector	Upstream and Downstream
Occupation	Petroleum product testing
Country	India
NSQF Level	5.5
Aligned to NCO/ISCO/ISIC Code	NCO/2015 3116.0500
Minimum Educational Qualification & Experience	Completed 3-year of UG(Chemistry) after 12th OR Pursuing 3rd year of 3-year UG (Chemistry) and continuing education OR Completed 2nd year of diploma (Petroleum/Chemical) (after 12th) with 1-year of relevant experience OR Completed 2nd year of 3-year UG(Chemistry) with 1-year of relevant experience OR Completed 3-year diploma after 10th with 2-years of relevant experience OR

## Qualification Pack

Minimum Level of Education for Training in School	NA
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	3-May-2023
Next Review Date	2-May-2026
NSQC Approval Date	3-May-2023
Version	1.0

## **HYC/N3901 Testing and Analysis of petroleum product**

### **Description**

This unit is about testing and analysis of petroleum product to determine the composition, quality and value by using different testing method and techniques.

### **Scope**

This unit/task covers the following:

- Testing and analysis of petroleum product

### **Elements and Performance Criteria**

#### *Testing and analysis of petroleum product*

To be competent, the user/individual on the job must be able to;

- PC1. check and verify the calibration of testing equipment
- PC2. prepare the test solutions, compounds for conducting tests and follow test procedures
- PC3. collect sample for analyzing and testing of crude oil and petroleum product
- PC4. test and analyze the sample as per American Society for Testing and Materials (ASTM) / Bureau of Indian Standards (BIS)/ Institute of Petroleum (IP) standards and procedure
- PC5. determine the crude oil fractions, analysis of fuel additives, oil contaminants, composition, quality and value of crude oil and other petroleum products, such as gasoline, diesel fuel, Naphtha, Kerosene / Aviation Turbine Fuel (ATF), lube oil, etc.
- PC6. Analyze the sample to determine presence of gases, gum, Sulphur, aromatics olefins, water and sediment using appropriate distillation columns
- PC7. separate crude oil into oils with different boiling points to determine their properties
- PC8. ensure the industry standards to maintain the quality
- PC9. collect data of testing and analysis of crude oil and other petroleum products to determine the chemical makeup and physical properties, density and viscosity
- PC10. compare test results with specifications and recommended processes to improve and control quality of products
- PC11. develop an efficient method for turning petroleum into effective fuel
- PC12. follow safety procedures during the test
- PC13. record test results, calculations, and output in the log book or datasheet

### **Knowledge and Understanding (KU)**

The individual on the job needs to know and understand:

- KU1. the basic principles of petroleum products
- KU2. standard operating procedures for testing petroleum products
- KU3. importance of calibration of tools and instruments
- KU4. organizational procedures for safe handling of equipment and machine operations
- KU5. reporting protocol and documentation required
- KU6. relevant health and safety requirements applicable to the workplace

- KU7. the importance of personal protective equipment used during the procedure performing
- KU8. ways of efficiently managing material and water in the process
- KU9. latest methods of energy and material conservation
- KU10. categorization of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics
- KU11. the difference between recyclable/reusable and waste material

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1. read and interpret the test data
- GS2. analyze the test result and output
- GS3. record data on waste disposal at workplace
- GS4. assess complexity and criticality of task
- GS5. communicate effectively with team members
- GS6. perform basic mathematical calculation
- GS7. complete tasks efficiently and accurately within stipulated time
- GS8. work constructively and collaboratively with others.
- GS9. delegate tasks to improve efficiencies
- GS10. plan and organize the marketing activity

**Assessment Criteria**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC1. check and verify the calibration of testing equipment	1	2		
PC2. prepare the test solutions, compounds for conducting tests and follow test procedures	2	2		
PC3. collect sample for analyzing and testing of crude oil and petroleum product	1	2		
PC4. test and analyse the sample as per American Society for Testing and Materials (ASTM) / Bureau of Indian Standards (BIS)/ Institute of Petroleum (IP) standards and procedure	2	3		
PC5. determine the crude oil fractions, analysis of fuel additives, oil contaminants, composition, quality and value of crude oil and other petroleum products, such as gasoline, diesel fuel, Naptha, Kerosene / Aviation Turbine Fuel (ATF), lube oil, etc.	1	3		
PC6. analyse the sample to determine presence of gases, gum, sulphur, aromatics olefins, water and sediment using appropriate distillation columns	2	2		
PC7. separate crude oil into oils with different boiling points to determine their properties	1	2		
PC8. ensure the industry standards to maintain the quality	2	2		
PC9. collect data of testing and analysis of crude oil and other petroleum products to determine the chemical makeup and physical properties, density and viscosity	1	3		
PC10. compare test results with specifications and recommended process to improve and control quality of products	2	3		
PC11. develop efficient method for turning petroleum into effective fuel	2	2		
PC12. follow safety procedures during the test	2	2		
PC13. record test results, calculations, and output in the logbook or datasheet	1	2		
<b>NOS Total</b>	<b>20</b>	<b>30</b>	-	-

**National Occupational Standards (NOS) Parameters**

<b>NOS Code</b>	HYC/N3901
<b>NOS Name</b>	Testing and Analysis of petroleum product
<b>Sector</b>	Hydrocarbon
<b>Sub-Sector</b>	Upstream and Downstream
<b>Occupation</b>	Petroleum product testing
<b>NSQF Level</b>	5.5
<b>Credits</b>	13
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	3-May-2023
<b>Next Review Date</b>	2-May-2026
<b>NSQC Clearance Date</b>	3-May-2023

## HYC/N9301 Working effectively in a team

### Description

This unit covers basic practices that improve effectiveness of working in a team in an organizational set-up

### Scope

This unit/task covers the following:

- Effective team work

### Elements and Performance Criteria

#### *Effective team work*

To be competent, the user/individual on the job must be able to:

- PC1. maintain clear communication with colleagues
- PC2. pass on information to colleagues in line with organizational requirements
- PC3. work in a team and support the team members
- PC4. work in ways that show respect to colleagues
- PC5. fulfil commitments made to colleagues
- PC6. inform team members timely, if timelines can't be met
- PC7. take the necessary initiatives to resolve the issues while working in team

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. the organization's policies and procedures related to team work in workplace
- KU2. the importance of effective communication and establishing good working relationships with colleagues
- KU3. Deeper understanding of actions & consequences of gendered behavior
- KU4. the importance of creating an environment of trust and mutual respect
- KU5. the implications of own work on the work and schedule of others
- KU6. the standard practice in organization w.r.t communication at various levels
- KU7. the instructions at individual level or at group level
- KU8. individual work responsibility and corrective measures required to complete task in time
- KU9. the importance of personal qualities like discipline and confidence to achieve success in work assigned

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1. communicate effectively in writing
- GS2. read instructions, guidelines/procedures
- GS3. communicate information effectively
- GS4. make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments
- GS5. how to plan the work to meet the deadline

- GS6. the importance of consistent and reliable services for customer satisfaction
- GS7. apply problem solving approaches in different situations
- GS8. apply balanced judgments to different situations

**Assessment Criteria**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Effective teamwork</i>	<b>20</b>	<b>30</b>		
<b>PC1.</b> maintain clear communication with colleagues	2	4	-	-
<b>PC2.</b> pass on information to colleagues in line with organisational requirements	3	5	-	-
<b>PC3.</b> work in a team and support the team members	3	4	-	-
<b>PC4.</b> work in ways that show respect to colleagues	3	4	-	-
<b>PC5.</b> fulfil commitments made to colleagues	3	5	-	-
<b>PC6.</b> inform team members timely, if timelines can't be met	3	4	-	-
<b>PC7.</b> take the necessary initiatives to resolve the issues while working in team	3	4	-	-
<b>NOS Total</b>	<b>20</b>	<b>30</b>	-	-

**National Occupational Standards (NOS) Parameters**

<b>NOS Code</b>	HYC/N9301
<b>NOS Name</b>	Working effectively in a team
<b>Sector</b>	Hydrocarbon
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	4
<b>Credits</b>	2.5
<b>Version</b>	3.0
<b>Last Reviewed Date</b>	3-May-2023
<b>Next Review Date</b>	2-May-2026
<b>NSQC Clearance Date</b>	3-May-2023

## **HYC/N9302: Maintain health, safety and security procedures**

### **Description**

This unit covers maintaining health, safety and security procedures at the workplace. This includes procedures and practices that candidates need to follow to help maintain a healthy, safe and secure work environment

### **Scope**

This unit/task covers the following:

- Practice health and safety measures
- Follow fire safety procedures
- Follow emergencies, rescue and first-aid procedures

### **Elements and Performance Criteria**

#### *Practice health and safety measures*

To be competent, the user/individual on the job must be able to:

- PC1.** use protective clothing/equipment for specific tasks and work conditions
- PC2.** identify documents, location and people responsible for health and safety in the workplace
- PC3.** identify possible causes of risk or accident in the workplace
- PC4.** carry out safe working practices while dealing with hazards to ensure the safety of self and others
- PC5.** lift heavy objects safely using correct procedures
- PC6.** identify common safety signs, displayed in various areas

#### *Follow fire safety procedures*

To be competent, the user/individual on the job must be able to:

- PC7.** use the various appropriate fire extinguishers on different types of fires correctly
- PC8.** follow rescue techniques applied during fire hazard
- PC9.** follow good housekeeping practice in order to prevent fire hazards
- PC10.** list issues concerning the safety in work place
- PC11.** inform fire safety department about any near-miss incidents in the work place
- PC12.** follow the applicable laws, regulations and codes as per safety standard
- PC13.** prepare written accident/incident report and share with the concerned officer/department

#### *Follow emergencies, rescue and first-aid procedures*

To be competent, the user/individual on the job must be able to:

- PC14.** provide appropriate first aid to victims in emergency situation
- PC15.** demonstrate basic techniques of bandaging
- PC16.** respond promptly and appropriately to an accident
- PC17.** perform rescue activity during an accident in real or simulated environments
- PC18.** demonstrate correct method to rescue injured people and others during an emergency

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. company's policies on personnel management and duty reporting procedure
- KU2. reporting structure within organization
- KU3. how to escalate problem
- KU4. concept of "hazards" and "risks"
- KU5. health and safety hazards commonly affecting the work environment and related precautions
- KU6. preventative and remedial actions to be taken in the case of exposure to toxic materials
- KU7. importance of using protective clothing/equipment while working
- KU8. various causes of fire
- KU9. techniques of using different types of fire extinguishers
- KU10. different materials used for extinguishing fire
- KU11. various types of safety signs and their significance

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1. communicate by writing
- GS2. read instructions, guidelines/procedures and reports
- GS3. communicate effectively and share the information efficiently
- GS4. identify and report potential sources of danger
- GS5. how to plan the work to meet the deadline
- GS6. the importance of on time services
- GS7. apply problem solving approaches in different situations
- GS8. apply balanced judgments to different situations

**Assessment Criteria**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Practice health and safety measures</i>	<b>9</b>	<b>15</b>		
<b>PC1.</b> use protective clothing/equipment for specific tasks and work conditions	1	4	-	-
<b>PC2.</b> identify documents, location and people responsible for health and safety in the workplace	2	1	-	-
<b>PC3.</b> identify possible causes of risk or accident in the workplace	1	3	-	-
<b>PC4.</b> carry out safe working practices while dealing with hazards to ensure the safety of self and others	2	2	-	-
<b>PC5.</b> lift heavy objects safely using correct procedures	1	3	-	-
<b>PC6.</b> identify common safety signs, displayed in various areas	2	2	-	-
<i>Follow fire safety procedures</i>	<b>12</b>	<b>16</b>		
<b>PC7.</b> use the various appropriate fire extinguishers on different types of fires correctly	2	2	-	-
<b>PC8.</b> follow rescue techniques applied during fire hazard	2	2	-	-
<b>PC9.</b> follow good housekeeping practice in order to prevent fire hazards	2	2	-	-
<b>PC10.</b> list issues concerning the safety in work place	1	3	-	-
<b>PC11.</b> inform fire safety department about any near-miss incidents in the work place	2	2	-	-
<b>PC12.</b> follow the applicable laws, regulations and codes as per safety standard	1	3	-	-
<b>PC13.</b> prepare written accident/incident report and share with the concerned officer/department	2	2	-	-
<i>Follow emergencies, rescue and first-aid procedures</i>	<b>4</b>	<b>19</b>		
<b>PC14.</b> provide appropriate first aid to victims in emergency situation	1	4	-	-

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<b>PC15.</b> demonstrate basic techniques of bandaging	1	4	-	-
<b>PC16.</b> respond promptly and appropriately to an accident	0	3	-	-
<b>PC17.</b> perform rescue activity during an accident in real or simulated environments	1	4	-	-
<b>PC18.</b> demonstrate correct method to rescue injured people and others during an emergency	1	4	-	-
<b>NOS Total</b>	<b>25</b>	<b>50</b>		

**National Occupational Standards (NOS) Parameters**

<b>NOS Code</b>	HYC/N9302
<b>NOS Name</b>	Maintain health, safety and security procedures
<b>Sector</b>	Hydrocarbon
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	4
<b>Credits</b>	2.5
<b>Version</b>	3.0
<b>Last Reviewed Date</b>	3-May-2023
<b>Next Review Date</b>	2-May-2026
<b>NSQC Clearance Date</b>	3-May-2023

### Assessment Guidelines and Assessment Weightage

#### Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on the knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for the theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6. To pass the Qualification Pack assessment, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

**Recommended Pass % aggregate for QP: 70**

### Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
HYC/N3901 Testing and analysis of petroleum product	20	30	-	-	50	60
HYC/N9301 Working effectively in a team	20	30	-	-	50	20
HYC/N9302 Maintain health, safety and security procedures	25	50			75	20
<b>Total</b>	<b>65</b>	<b>110</b>	<b>-</b>	<b>-</b>	<b>175</b>	<b>100</b>

### Acronyms

NOS – National Occupational Standard(s)

OS – Occupational Standard(s)

NSQF – National Skills Qualifications Framework

QP – Qualifications Pack

KU – Knowledge and Understanding

GS – Generic Skills

SOP- Standard operating procedure

## Glossary

<b>Sector</b>	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards(OS)</b>	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
<b>Performance Criteria(PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards(NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack(QP)</b>	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
<b>Scope</b>	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

<p><b>Knowledge and Understanding (KU)</b></p>	<p>Knowledge and Understanding (KU) are statements that together specify the technical, generic, professional and organisational specific knowledge that an individual need in order to perform to the required standard.</p>
<p><b>Organisational Context</b></p>	<p>Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.</p>
<p><b>Technical Knowledge</b></p>	<p>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</p>
<p><b>Core Skills/Generic Skills(GS)</b></p>	<p>Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today’s world. These skills are typically needed in any work environment in today’s world. These skills are typically needed in any work environment. In the context of the OS, these include communication-related skills that are applicable to most job roles.</p>
<p><b>Electives</b></p>	<p>Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.</p>
<p><b>Options</b></p>	<p>Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.</p>