

# Participant Handbook

Sector  
**Hydrocarbon**

Sub-Sector  
**Downstream (Oil Refining and Marketing)**

Occupation  
**Retail Distribution**

Reference ID: **HYC/Q3101, Version 1.0**  
**NSQF Level 4**



**Retail Outlet  
Attendant (Oil & Gas)**

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Hydrocarbon Sector Skill Council

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**Shri Narendra Modi**  
Prime Minister of India

“ Skilling is building a better India.  
If we have to move India towards  
development then Skill Development  
should be our mission. ”



## Certificate

**COMPLIANCE TO  
QUALIFICATION PACK – NATIONAL OCCUPATIONAL  
STANDARDS**

is hereby issued by the

**HYDROCARBON SECTOR SKILL COUNCIL**

for

**SKILLING CONTENT : PARTICIPANT HANDBOOK**

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **'Retail Outlet Attendant'** OP No. **'HVC/Q 3101 NSQF Level 4'**

Date of Issuance: Feb 20<sup>th</sup>, 2018  
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\*Valid up to the next review date of the Qualification Pack or the  
'Valid up to' date mentioned above (whichever is earlier)

Authorised Signatory  
(Hydrocarbon Sector Skill Council)

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## About this book

This book is designed for providing skill training and/ or upgrading the knowledge and basic skills to take up the job of a 'Retail Outlet Attendant' in the Hydrocarbon sector.

This Participant Handbook is designed based on the Qualification Pack (QP) under the National Skill Qualification Framework (NSQF) and it comprises the following National Occupational Standards (NOS)/ topics.

- HYC/N 3101 Perform Retail Outlet (Fuel Station) Activities
- HYC/N 3102 Maintain Safe and Secure Working Environment
- HYC/N 3103 Maintain Health and Hygiene habits
- HYC/N 3104 Maintain Customer-Centric Service Orientation

## Symbols Used



Key Learning  
Outcomes



Steps



Exercise



Tips



Notes



Objectives









# 1. Introduction

- Unit 1.1 - Introduction to the Training Programme
- Unit 1.2 - Introduction to the Hydrocarbon Sector
- Unit 1.3 - Introduction to the Downstream Segment
- Unit 1.4 - Role of a Retail Outlet Attendant



## Key Learning Outcomes



**At the end of this unit, you will be able to:**

1. Explain the purpose of the training programme
2. State the benefits of the training programme
3. Discuss the Qualification Pack and National Occupation Standards
4. Describe the hydrocarbon sector
5. Explain what hydrocarbons are and describe the different types of Hydrocarbons
6. Describe the refining process for crude oil
7. State the different types of fuels
8. List the three major segments in the hydrocarbon sector
9. State the functions of the downstream segment
10. Explain the roles and responsibilities of a Retail Outlet Attendant

## UNIT 1.1: Introduction to the Training Programme

### Unit Objectives

**At the end of this unit, you will be able to:**

1. Explain the purpose of the training programme
2. State the benefits of the training programme
3. Discuss the Qualification Pack and National Occupation Standards

### 1.1.1 Introduction to the Training Programme

This training programme is developed to impart specific skills to individuals who wish to work as a Retail Outlet Attendant.

The training programme is based upon the National Occupational Standards for Retail Outlet Attendant. The National Occupational Standards have been described in the following sub-section of this session.

The training programme will enable an individual to:

- Perform specialised work such as Pre-Fuelling, Fuelling and Post-Fuelling activities.
- Follow the safety guidelines for a Retail Outlet.
- Demonstrate the handling of equipment used at a Retail Outlet.
- Follow and maintain personal health, hygiene and work in line with safety environmental protocols.
- Achieve customer satisfaction by providing excellent service.
- Build a good rapport with the customer through effective communication.

### 1.1.2 Benefits of the Training Programme

After successful completion of the training programme, the participants will undergo an assessment which will have a theory and a practical test.

- On successfully passing the assessment, a certificate will be awarded by the Hydrocarbon Sector Skill Council.
- This will help you in getting employed as a Retail Outlet Attendant in downstream companies or in working independently.

### 1.1.3 Introduction to QP and NOS

This training programme is intended to impart basic skill and knowledge relevant to a Retail Outlet Attendant and the activities required to be performed at the outlet. This programme is based on the qualification pack called Retail Outlet Attendant. The Qualification Pack Code for Retail Outlet Attendant is HYC/Q 3101. This is also called a QP. A QP consists of a set of National Occupational Standards (NOS). NOS specify the standardised level of competency a worker should possess in order to perform the enlisted function at the workplace. Under the Retail Outlet Attendant QP, there are four NOS which detail the functions to be performed at the work site by the Retail Outlet Attendant.

NOS Code	Major Function/Task
HYC/N 3101	Perform Retail Outlet (Fuel Station) Activities
HYC/N 3102	Maintain Safe and Secure Working Environment
HYC/N 3103	Maintain Health and Hygiene
HYC/N 3104	Maintain Customer-Centric Service Orientation

## UNIT 1.2: Introduction to the Hydrocarbon Sector

### Unit Objectives



At the end of this unit, you will be able to:

1. Describe the hydrocarbon sector
2. Explain what hydrocarbons are and describe the different types of hydrocarbons
3. Describe the refining process for crude oil
4. State the different types of fuels

### 1.2.1 About the Hydrocarbon Sector

The Hydrocarbon sector is one of the six-core industries in India and therefore has an impact on all the other sectors, industries, and segments in the country. Since India is a developing nation, there is an ever-increasing demand for energy and this demand further influences the growth of this sector. Today, 57 per cent of India's domestic crude oil production comes from Oil and Natural Gas Corporation (ONGC). India is also the fourth-largest importer of Liquefied Natural Gas (LNG) in the world.

One of the reasons why this sector is projected to flourish is government initiatives. State-run oil firms are working towards improving the Liquefied Petroleum Gas (LPG) infrastructure in Uttar Pradesh, which will also help create clean energy and generate employment. The Government of India (GOI) has introduced various policies in order to promote the use of biofuels for transport. Additionally GOI is also planning to build refineries in Rajasthan and Maharashtra, increase the use of LNG, and auction off oil and gas fields. GOI is also planning to create an integrated oil major that will compete in the global market.

The Hydrocarbon sector has played a vital role in the economic growth of the country.

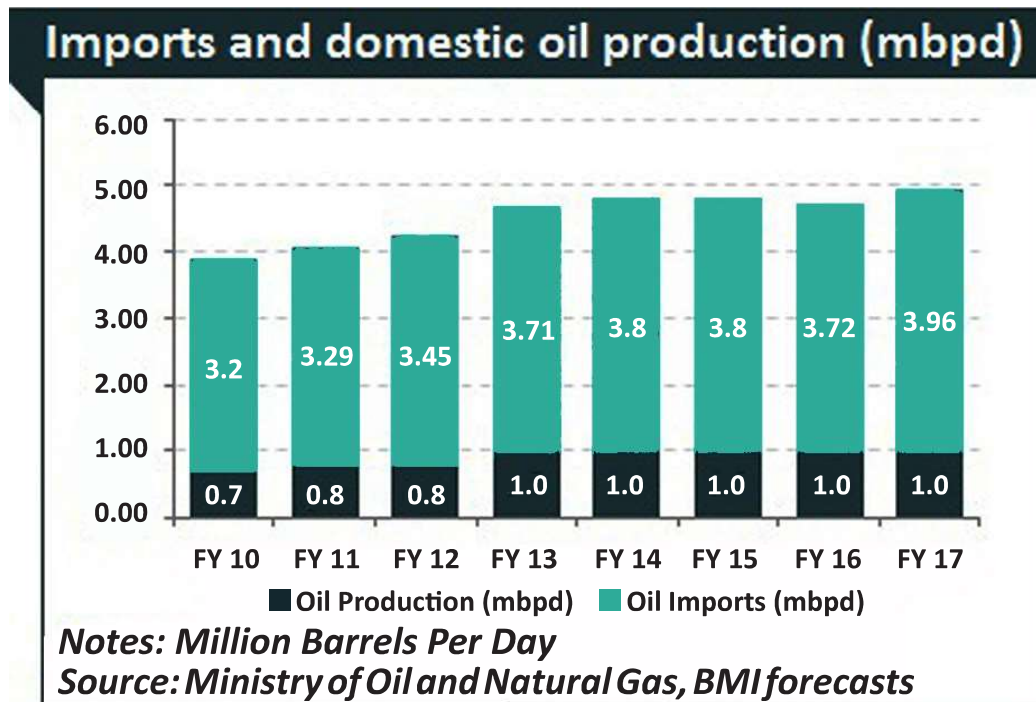


Fig. 1.2.1. Economic growth

The oil and gas (hydrocarbon) sector has seen significant growth over the past few years. India's energy consumption has almost doubled since 2000 and the potential for further rapid growth is enormous.

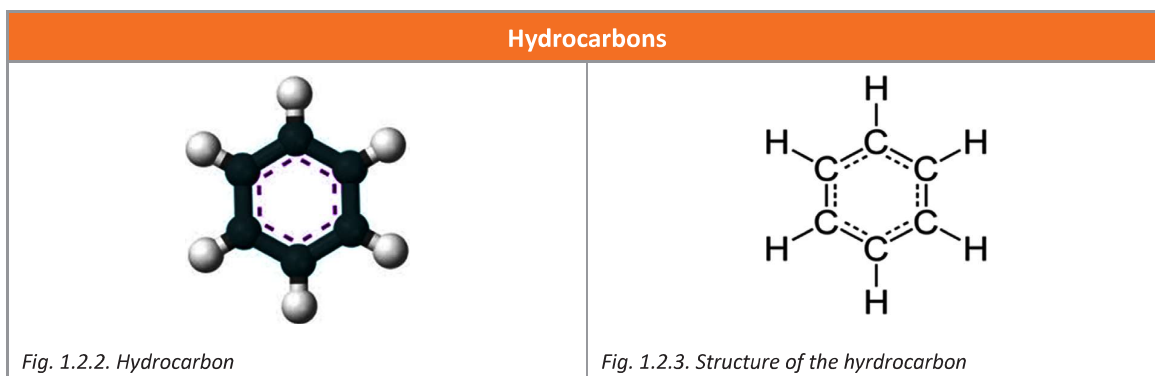
According to data<sup>1</sup> released by the Department of Industrial Policy and Promotion (DIPP), the petroleum and natural gas sector attracted FDI worth US\$ 6.86 billion between April 2000 and September 2017.

The Ministry of Petroleum and Natural Gas (MOP and NG) is a Ministry of the Government of India responsible for the exploration, production, refining, distribution, marketing, import, export, and conservation of petroleum, natural gas, petroleum products, and liquefied natural gas in India. They are the apex body for laying down the guidelines and rules for the petroleum and natural gas segment.

The Hydrocarbon Sector Skill Council (HSSC) plays a crucial role in the skill development ecosystem in India. Their job is to ensure that the training is relevant to industry needs and is aligned with the national skill development policy. As autonomous bodies, they front-end various activities and take measures to identify and close the skill gaps under the hydrocarbon segment.

## 1.2.2 About Hydrocarbons

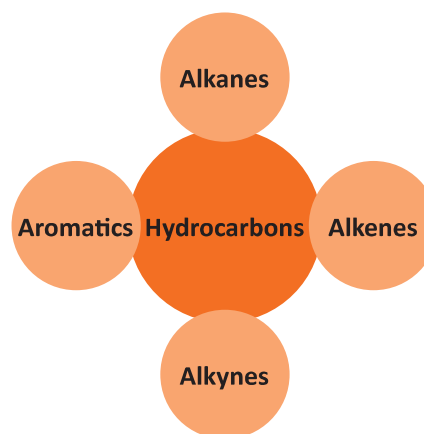
Hydrocarbons are organic compounds which are made up of hydrogen and carbon atoms.



### Types of Hydrocarbons:

There are four basic types of hydrocarbons:

- The common usages of alkanes are in natural gas and petroleum fuels.
- Alkenes are used in the syntheses of alcohols, plastics, lacquers, detergents, and fuels.
- Acetylene is used to cut and weld steel.
- Many aromatic compounds are used as solvents to remove or thin out oil or grease-based compounds. Toluene, for example, is an ingredient in paint thinners.



*Fig. 1.2.4. Types of hydrocarbons*

1- <https://www.ibef.org/industry/oil-gas-india.aspx>

Many of the fuels which we use are hydrocarbons. The majority of the hydrocarbons found naturally are present in crude oil. Crude oil is a mixture of hydrocarbons that exists as a liquid found underground or underwater. Hydrocarbons in crude oil can generally be divided into four categories:

Hydrocarbons in Crude Oil	Weight
Paraffins	15 to 60%
Napthenes	30 to 60%
Aromatics	3 to 30%
Asphaltics	6%

#### What is Petroleum?

Petroleum is a naturally occurring, yellow-to-black liquid found beneath the Earth's surface. It is a general term for crude oil and natural gas.

### 1.2.3 Refining of Crude Oil

Refining of crude oil refers to the process of converting crude oil into useful products. The process is divided into three basic steps: separation, conversion, and treatment.

#### 1. Separation or Distillation process

Separation refers to the process of distillation. Crude oil is heated in a furnace so that hydrocarbons can be separated according to their weight and boiling point.

#### 2. Conversion

Conversion is simply the process of changing one kind of hydrocarbon into another.

#### 3. Treatment

Treatment is the final process of refining. One common example of treatment is the removal of sulphur from diesel fuel, which is necessary for it to meet clean air guidelines.

#### Distillation Process

This process is based on the principle that different substances boil at different temperatures. In the distillation process, crude oil is heated and fed into a tall steel tower called a distillation column and then separated into its components according to their boiling points. As the temperature of the crude oil in the distillation column rises, the crude oil separates itself into different components. Each component corresponds to a different type of petroleum product, depending on its boiling temperature.

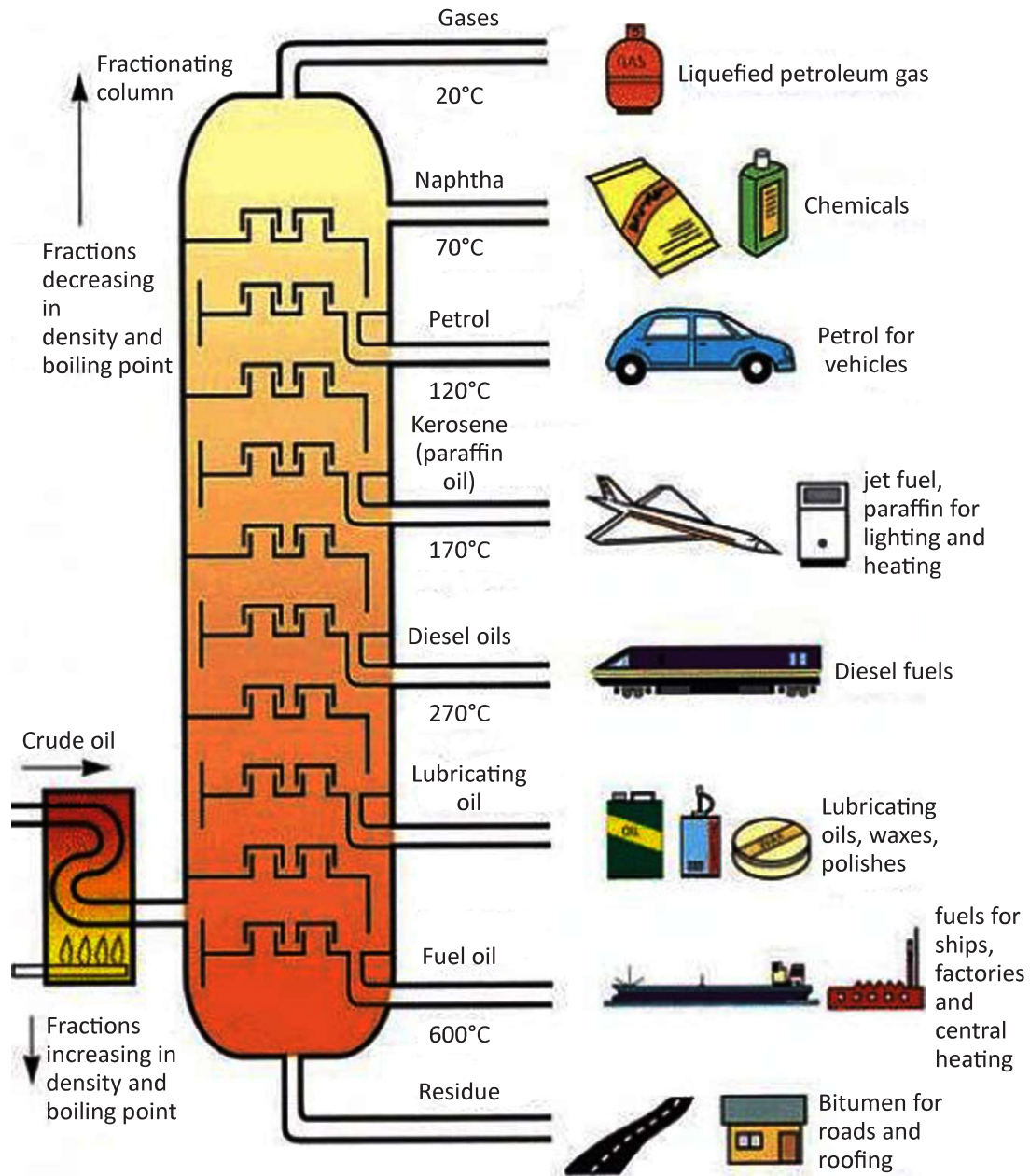


Fig. 1.2.5. Distillation process



## 1.2.4 Types of Fuel

There are three main types of fuels – solid fuels, liquid fuels and gaseous fuels.

### Fuel Types and Examples

#### Solid fuels



Fig. 1.2.6. Wood



Fig. 1.2.7. Coal



Fig. 1.2.8. Cow Dung

Some more examples are coke, charcoal, etc.

#### Liquid fuels



Fig. 1.2.9. Diesel, Petrol



Fig. 1.2.10. Kerosene



Fig. 1.2.11. Coal Tar

Some more examples are petrol, naphtha, ethanol, etc.

#### Gaseous fuels



Fig. 1.2.12. CNG



Fig. 1.2.13. LPG



Fig. 1.2.14. Biogas

## UNIT 1.3: Introduction to the Downstream Segment

### Unit Objectives



At the end of this unit, you will be able to:

1. List the three major segments in the hydrocarbon sector
2. State the functions of the downstream segment

### 1.3.1 Different Segments of Hydrocarbon Sector (Petroleum Industry)

The petroleum industry is divided into three major segments: Upstream, Midstream, and Downstream.

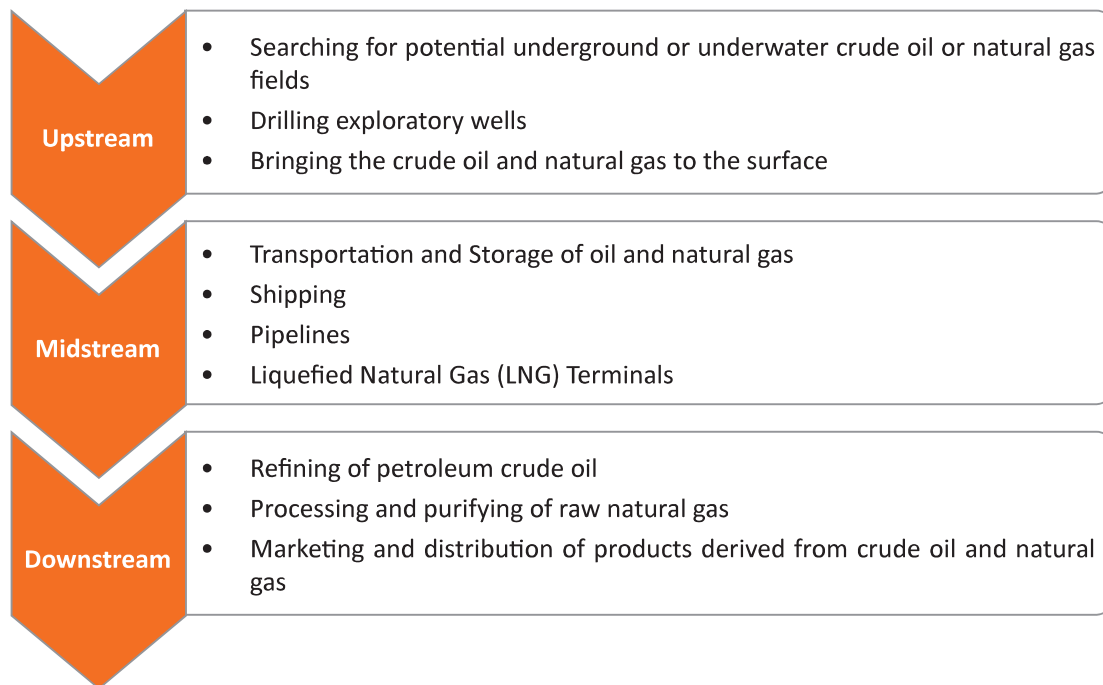


Fig. 1.3.1. Different segments of hydrocarbon sector

Processes involved in different segments of the petroleum industry:

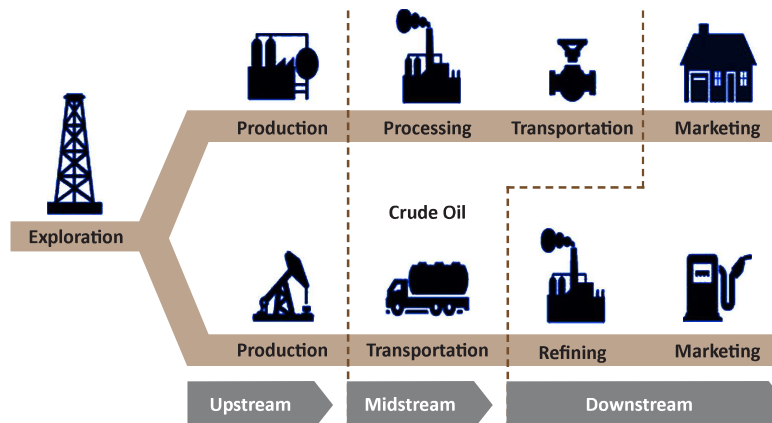


Fig. 1.3.2. Processes involved in different segments of the petroleum industry

### 1.3.2 About the Downstream Segment

The downstream segment involves the refining of petroleum crude oil and the processing and purifying of raw natural gas, as well as the marketing and distribution of products derived from crude oil and natural gas. The downstream segment reaches consumers through products such as petrol, kerosene, jet fuel, diesel oil, fuel oils, lubricants, waxes, asphalt, natural gas, and Liquefied Petroleum Gas (LPG), etc.

#### About the Downstream Segment in India



*Fig. 1.3.3. Downstream segment*

The Downstream Segment is also known as the oil and gas industry. The oil and gas industry is among the six core industries in India. It plays a major role in influencing the decision-making for all the other important sections of the economy. India's downstream segment has 19 refineries in the public sector and three in the private sector. Private companies such as Reliance Industries Ltd. and Essar Oil are the major refiners. In the year 2016, public sector refineries accounted for 54.42% of total refinery crude throughput and the private sector refineries' total crude throughput grew at a CAGR of 9.28%, reaching 88.7 million metric tonnes (MMT).

In the year 2016, total consumption of petroleum products by companies stood at around 183.5 MMT, higher by 11.2% in comparison with the previous fiscal year. The total number of retail outlets increased to 56,190 (including private) in April 2016 (provisional) from 53,419 in April 2015.

## UNIT 1.4: Role of a Retail Outlet Attendant

### Unit Objectives



At the end of this unit, you will be able to:

1. Explain the roles and responsibilities of a Retail Outlet Attendant

### 1.4.1 Importance of a Retail Outlet Attendant

The prime responsibility of a Retail Outlet Attendant is to refuel vehicles. He is the first person who comes in contact with the customer and represents the organisation. So, the manner in which he/she deals with a customer will create an image of the organisation in the mind of a customer. This is why he is the vital link between the organisation and the customer, as the responsibility of treating and serving the customer lies with the Retail Outlet Attendant.



Fig. 1.4.1. Retail outlet attendant at work

A customer spends only five to six minutes at a Retail Outlet, so this is a limited time to create a long lasting impression which will make the customer visit the outlet repeatedly. A Retail Outlet Attendant has to exhibit excellent service and have a customer centric approach.

As the fuel price and quality of the products offered at different Retail Outlets is at par, the only differentiating factor is the services provided at the Retail Outlet, which can be the deciding factor for customer retention. Hence, it is very important for the Retail Outlet Attendant to understand his job and the responsibilities. A Retail Outlet Attendant should be sensitive towards the customer's needs, safety aspects, and communication skills, etc.

## 1.4.2 Job Description of a Retail Outlet Attendant

A Retail Outlet Attendant must be aware of following as part of their job description:

- Fill petrol/diesel in the customers' vehicle, as per their requirement.
- Follow safety guidelines at the retail outlet.
- Be honest and to be a person of integrity.
- Be courteous and polite to the customer.
- Have basic reading and writing skills.
- Be well-groomed and hygienic.
- Be alert and vigilant at all times.
- Know the possible hazards and safety measures.



Fig. 1.4.2. Retail Outlet Attendant



Fig. 1.4.3. Retail Outlet Attendant



Fig. 1.4.4. Retail Outlet Attendant

Career Path of Retail Outlet Attendant

An individual may progress to the Supervisor level at the Retail Outlet.



Fig. 1.4.5. Career Path for Retail Outlet Attendant

## Exercise



Read the questions carefully and answer them.

1. What are your expectations from this training programme?

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2. Who is a Retail Outlet Attendant?

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3. What are the three main segments of the hydrocarbon sector?

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4. List the roles and responsibilities of a Retail Outlet Attendant.

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**Hands-on practice sessions will be conducted at the Retail Outlet**

## Tips



- Hydrocarbons are organic compounds which are made up of hydrogen and carbon atoms.
- The four basic types of hydrocarbons are – Alkanes, Alkenes, Alkynes and Aromatics.
- Fuels are divided into three main types – Solid fuels, Liquid fuels and Gaseous fuels.
- The three major segments of Hydrocarbon Sector are: Upstream, Midstream, and Downstream.









## 2. Perform Retail Outlet (Fuel Station) Activities

Unit 2.1 - About Retail Outlet

Unit 2.2 - Pre-Fuelling Activities at Retail Outlets

Unit 2.3 - Fuelling Activities at Retail Outlets

Unit 2.4 - Post-Fuelling Activities at Retail Outlets



## Key Learning Outcomes

**At the end of this unit, you will be able to:**

1. Describe the Retail Outlet and the types of Retail Outlets
2. Perform Pre-Fuelling, Fuelling, and Post-Fuelling activities in a Retail Outlet
3. State the dos and don'ts during the Fuelling process
4. State all the safety measures to follow during the Fuelling process
5. Describe the Post-Fuelling process

## UNIT 2.1: About Retail Outlets

### Unit Objectives

At the end of this unit, you will be able to:

1. Describe the Retail Outlet and the types of Retail Outlets
2. Perform Pre-Fuelling, Fuelling, and Post-Fuelling activities at a Retail Outlet

### 2.1.1 What is a Retail Outlet?

A Retail Outlet is commonly known as a petrol pump or a gas station. The most common point of contact of customers with the oil industry is the petrol pump. This place caters to the refuelling needs of motor vehicles – two wheelers, four wheelers, and other heavy vehicles.

Following are areas of a Retail Outlet:



Fig. 2.1.1. Retail outlet



Fig. 2.1.2. Retail outlet



Fig. 2.1.3. Retail outlet



Fig. 2.1.4. Retail outlet



Fig. 2.1.5. Retail outlet

Retail Outlet sells petrol, diesel, CNG, Auto LPG, and other products like lubricants, engine oil, brake oil, coolants, and other consumables of the vehicles.

## 2.1.2 Types of Retail Outlets

There are three types of Retail Outlets, namely:



Fig.2.1.3. Rural retail outlet

### Rural Retail Outlet

The Rural Retail Outlet is a small format outlet with basic amenities.



Fig.2.1.4. Urban retail outlet

### Urban Retail Outlet

A retail outlet in the urban/city area is known as an urban outlet. These outlets are located in cities where the population density is higher.



Fig.2.1.5. Highway retail outlet

### Highway Retail Outlet

Retail outlets situated on national highways or state highways are called Highway Retail Outlets. They are a large format outlet with extended amenities.

#### Characteristics of all three Retail Outlets:

##### Characteristics of a Rural Retail Outlet:

- The majority of customers in rural areas are from an agricultural background.
- There are seasonal sales of High Speed Diesel (HSD) for Diesel Generator (DG) sets/tractors etc. as per crop requirements.
- A few of these Retail Outlets also sell seeds/manure required by farmers.

##### Characteristics of an Urban Retail Outlet:

- This Retail Outlet caters to customers who are always in hurry as they look for quick services.
- They also look for facilities like car wash, ATMs, eating joints and washrooms, etc.
- Convenience stores are an added advantage for urban outlets.

##### Characteristics of a Highway Retail Outlet:

- These outlets are vast in their size in comparison to the rural and urban outlets.
- A majority of the customers are heavy vehicle drivers and they usually drive for long hours at a stretch. They need facilities like secured parking, *dhaba*, rest rooms, toilets and bathing facilities etc.

## 2.1.3 Products and Services at a Retail Outlet

A Retail Outlet Attendant should be aware of the Products and Services that are available at a Retail Outlet.

### 2.1.3.1 Products at a Retail Outlet

Petrol, Diesel, CNG, Auto LPG, and Lubricants are products sold at a Retail Outlet.

Motor Spirit (MS) commonly known as Petrol, is used mainly for passenger vehicles such as two, three, and four wheelers.

#### Characteristics of Petrol:

- A Petrol fueled internal combustion engine obtains energy from combustion of gasoline's various hydrocarbon species with oxygen from the ambient air, yielding carbon dioxide and water exhaust.
- The density of petrol ranges from 720 to 775 kg/m<sup>3</sup> at 15°C.

#### Flammability:

Petrol burns in a limited range of its vapour phase and, coupled with its volatility, this makes leaks highly dangerous when sources of ignition are present.

- Normal Petrol: It is normally used as a fuel for spark ignition internal combustion engines such as passenger cars, two wheelers, three wheelers, etc.
- Branded Petrol: This is preferred by new generation vehicles. It is slightly costlier than normal petrol. It has additives for optimising the performance of vehicles. It provides benefits like cleaning and prevention of carbon deposits, reduced smoke / emissions, better acceleration and pick up and a smooth driving experience.
- Ethanol Blended Petrol: The Ministry of Petroleum and Natural Gas has put in place the specifications for the marketing of Ethanol Blended Petrol (EBP). Currently 10% Ethanol is blended in Petrol and sold in the market. EBP is also known as Gasohol.

This is an initiative by the Government of India, because of the environmental benefits that Ethanol has. It is the most environmentally friendly alternative to fuel that works in the cars we already have. It reduces greenhouse gas emissions by as much as 59 percent relative to gasoline, and keeps harmful chemicals out of air.

High Speed Diesel (HSD) commonly known as Diesel preferred for heavy vehicles.

#### Characteristics of High Speed Diesel:

- Diesel fuel is a form of light fuel oil, very similar to kerosene (paraffin). However, diesel engines, especially older or simple designs that lack precision electronic injection systems, can run on a wide variety of other fuels.
- Density of Diesel ranges from 815-845 kg/m<sup>3</sup> at 15°C.

#### Flammability:

Diesel fuel is less flammable than Petrol, leading to a lower risk of fire caused by fuel in a vehicle equipped with a diesel engine. However, because it evaporates slowly, any spills on a roadway can pose a slip hazard to vehicles. After the light fractions have evaporated, a greasy slick is left on the road which reduces tyre grip and traction, and can cause vehicles to skid.

- Normal Diesel: These are used in heavy commercial vehicles, buses, tractors, motor cars, pump sets and in various other diesel engine driven applications.
- Branded Diesel: Branded Diesel contains additives intended to improve gas mileage, reduce carbon monoxide and increase performance.

Compressed Natural Gas (CNG): CNG is an environment-friendly fuel.

**Characteristics of CNG:**

- CNG is made by compressing natural gas is mainly composed of methane (CH<sub>4</sub>) to less than 1 per cent of the volume it occupies at standard atmospheric pressure. It is stored and distributed in hard containers at a pressure of 20–25 Megapascal (2,900–3,600 psi), usually in cylindrical or spherical shapes.
- CNG's volumetric energy density is estimated to be 42 percent that of liquefied natural gas, and 25 percent that of diesel fuel.

Flammability:

CNG is highly flammable because it's lighter than Petrol and Diesel, since it is lighter than air, and odourless it vanishes in to thin air. If it comes in contact with any source ignition, it can cause fire hazards.

- CNG is available at select outlets of companies in some cities. There are also Standalone Retail Outlets for CNG in select cities.
- CNG can be used in vehicles which are fitted with a special kit to be able to run on this fuel. The vehicle needs mechanical change for this purpose.
- Its availability is being gradually increased at urban Retail Outlets.

Auto Liquefied Petroleum Gas (ALPG):

ALPG is a clean and environment-friendly fuel. When LPG is used to fuel internal combustion engines, it is often referred to as autogas or auto propane.

**Characteristics of Auto LPG:**

- LPG burns more than higher molecular weight hydrocarbons because it releases less particulates. LPG at atmospheric pressure and temperature is a gas which is 1.5 to 2.0 times heavier than air. It is easily liquefied under moderate pressures. The density of the liquid is approximately half that of water and ranges from 0.525 to 0.580 at 15 degree Celsius.
- Since LPG vapour is heavier than air, it would normally settle down at ground level/ low lying places, and accumulate in depressions.

Flammability:

- LPG has an explosive range of 1.8% to 9.5% volume of gas in air. This is considerably narrower than other common gaseous fuels. This gives an indication of hazard of LPG vapour accumulated in low lying area in the eventuality of the leakage or spillage. The auto-ignition temperature of LPG is around 410-580 degree Celsius, and it will not ignite on its own at normal temperature.
- Entrapped air in the vapour is hazardous in an unpurged vessel/ cylinder during pumping/ filling-in operation. In view of this it is not advisable to use air pressure to unload LPG cargoes or tankers.

**Lubricants:**

This is a vital product for the healthy life of an engine. A lubricant is a viscous product used in the engine for its smooth functioning and to reduce the wear and tear of the engine. Different grades of lubricants are needed for different engines, gear boxes and other components. There are different engine oils for different vehicles like two wheelers, four wheelers, and other heavy motor vehicles.

## 2 1.3.2 Services at a Retail Outlet

A Retail Outlet offers a range of services, as shown:



Fig. 2.1.6. Air service

Air Service provided at Retail Outlet are as per standards prescribed by the vehicle manufacturers viz., accurate air pressure for different vehicles, rear and front tyers etc. Further, Air Towers are located at convenient place in a Retail Outlet for quick service to the customer.



Fig. 2.1.7. Oil-change service

Oil change service is quick service provided at a Retail Outlet for a vehicle's engine, piston, brake etc. as these parts generate heat due to friction/ wear and tear.



Fig. 2.1.8. PUC service

Pollution Under Control (PUC) Service is related to vehicle exhaust emission such as carbon monoxide, carbon dioxide, hydrocarbons, and nitrogen oxides, and such gases contribute to global warming. PUC helps in checking the emission levels of our vehicles.

PUC certificate is mandatory for vehicles.



Fig. 2.1.9. Vehicle-wash service

Vehicle-Wash Service is provided at retail outlet if the customer wants to use it.





Fig. 2.1.10. Windscreen cleaning

Windscreen Cleaning is important as a dirty windscreen is potentially dangerous because it limits the driver's ability to see the road.



Fig. 2.1.11. Allied retail business

Allied Retail Business implies that the retail outlet has an alliance with ATM, general stores, eateries, or supermarkets. These facilities are offered for the customer's convenience.



Fig. 2.1.12. Drinking water facilities

Clean Drinking Water is provided at a Retail Outlet.



Fig. 2.1.13. Washroom facilities

Clean Washroom Facilities are provided for the customer's comfort.