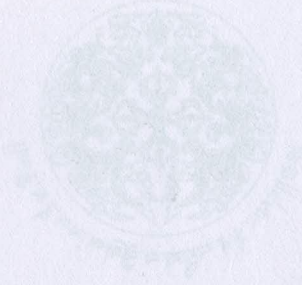




**GUIDELINES ON THE STORAGE, HANDLING AND
DISPENSING
AT
PETROLEUM RETAIL OUTLETS**

**DEPARTMENT OF TRADE
MINISTRY OF ECONOMIC AFFAIRS
ROYAL GOVERNMENT OF BHUTAN
THIMPHU: BHUTAN**



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PREAMBLE

Retail Outlets are the principal installations for refueling of MS/HSD for automotive use. The safety of these installations is of paramount concern keeping in view the associated hazards of petroleum products handled involving vehicles and public. Accidents at Petroleum Retail Outlets in the recent past emphasized the need to review the existing operation and maintenance practices in Petroleum Retail Outlets. Therefore, a need was felt to frame a standard for safe storage, handling of Petroleum Products at Retail Outlet. This standard lays down the minimum requirements in design, operation, inspection, maintenance, training, consumer safety at Petroleum Retail Outlets (PRO).

1. INTRODUCTION

Motor Spirit (MS) / High Speed Diesel (HSD) are widely used as automotive fuels. *There* has been high growth in consumption of these products commensurate with the increase in *number* of vehicles. Accordingly, numbers of retail outlets for dispensing of MS/ HSD have gone up in the country. Accordingly, a need was felt to frame guidelines on safety of these Petroleum Retail Outlets as safety at these installations is one of the important considerations in view of the hazards associated with handling of these products, operating conditions such as pressure, storage of other flammable materials etc.

2. DEFINITIONS

Authorised Person: A person trained and assigned to carry out a specific job by the dealer.

Dispenser: The equipment provided in the retail outlet for delivering MS/ HSD to the Auto Fuel Tank of motor vehicles / approved receptacles.

Fill Point: The point of inlet pipe connection of a bulk storage tank for MS/ HSD where hose is connected for filling the products into the tank.

Vent Pipe: The pipe fitted on an underground tank in Petroleum Retail Outlets for breathing.

Petroleum Retail Outlet: The area provided with facilities and specially designed for storage and dispensing to the fuel tanks of motor vehicles and any other approved receptacles.

Tank Truck / Tank Lorry / POL Tank Lorry: A truck mounted with a properly designed and approved tank for transportation of MS / HSD in bulk to the dispensing stations.

3. LAYOUT & FACILITIES

3.1 General

3.1.1. The space chosen for a petroleum retail outlet shall be sufficiently spacious to allow it to minimize the risk from the petroleum fuels to any person likely to be at or near the retail station.

3.1.2. The layout should ensure unobstructed movement of all vehi-

cles together with adequate provision for entry and exit of Tank trucks.

3.1.3. Location of the facilities, equipment, entrance, exit & paving shall be arranged in a manner to avoid the risk of any collision amongst the motor vehicles.

3.1.4. Access for mobile firefighting equipment to all the Retail Outlet facilities shall be ensured.

3.1.5. The location of tanks, filling and vent pipes, dispensing equipment and road tanker decanting area as well as on site buildings shall be designed to provide for satisfactory means of escape for persons in the event of fire or other incident.

3.1.6. The hazardous areas shall be protected from sources of ignition.

3.2 Storage Tanks

3.2.1. Petroleum shall be stored only in underground tanks in single / double walled [membrane] and its installation shall be outside any public risk.

3.2.2. These shall be placed in an earthen or masonry or concrete pit and shall be packed with sand/earth/gravel without leaving any space between the tank and concrete/masonry wall.

3.2.3. No part of the space over the buried tanks shall be used for any purpose other than installing equipment specifically meant for the withdrawal/ monitoring of contents of the tank.

3.3 Fill points

3.3.1. The fill points for the tank/tanks, whether off set or direct fill

shall be located in such a manner so that any spillage of petroleum and its subsequent ignition does not pose any immediate threat to members of the public or fire crew or delivery staff.

- 3.3.2. Fill points shall be located in the open air such that any flammable concentrations of vapours resulting from normal filling operations or spillage does not reach potentially ignition sources, or accumulates in either building or out door locations so as to pose a danger.
- 3.3.3. The fill points shall maintain a minimum safety distance of 3 meters, all around including property boundaries or any other structure where a source of ignition is likely to be present. This distance of 3 m may be reduced if a fire – resistant wall is constructed, e.g. of brick or concrete, which is at least 2 m high and extends sideways or parallel to the boundary. If the wall is a part of a building which houses a sensitive population, such as a school, hospital or residential dwelling, this distance should be increased to 12 m.
- 3.3.4. Fill pipes shall have minimum 1:200 slopes towards the storage tank to ensure easy flow due to gravity and also to avoid any product retention within the fill pipe.
- 3.3.5. Fill pipe shall be carried down nearly to the bottom of the tank to prevent fire hazard due to generation of static charge arising out of free fall of product.
- 3.3.6. Proper identification of fill points for various types of fuels shall be provided to avoid wrong decantation.
- 3.3.7. An “earthing bus” shall be provided in the close vicinity of fill points.

3.3.8. Hose connections shall be properly tightened using screwed / cam lock couplings.

3.3.9. Fill pipe caps shall be made of softer material like brass or aluminium.

3.3.10. Fill cap shall have a proper locking system and key shall be kept under the custody of the authorized person

3.3.11. Fill points shall be so located that the tank lorry when under decantation is in drive out position.

3.4 Pipelines

3.4.1. Pipelines from tanks to dispensing points and vent pipes shall be routed below the ground surface. It shall not be under a building or other features which prevent access to the pipelines after installation. Fuel Pipes should be sloped towards Underground Storage Tank.

3.4.2. Provision shall be made in the piping including connection to the bulk storage vessel to compensate for expansion, contraction, jarring and vibration

3.4.3. Pipe lines shall be earthed and to maintain electrical continuity suitable “Jumpers” to be provided at the flanged joints to ensure dissipation of static charge developed due to product flow in pipe line.

3.4.4. The pipelines shall be protected against corrosion by suitable coating strapping and where necessary by cathodic protection.

3.5 Vent pipes

- 3.5.1. Each tank shall be provided with independent vent pipe(s) of adequate capacity unless vapour recovery system is installed.
- 3.5.2. Vent point shall never be located under any shade /cover.
- 3.5.3. The vent pipe shall be protected against damage by inadvertent collision with vehicles.
- 3.5.4. The outlet (opening) of the vent pipe shall be covered with two layers of non corrosive metal wire mesh.
- 3.5.5. Vent pipe shall be gradually sloped towards the tank to avoid chocking of vent pipe due to any water ingress or due to product in the event of tank overflow.
- 3.5.6. The vertical portion of the vent pipe shall not be provided with any intermediate thread joint.

3.6. Dispensing equipment

- 3.6.1. Dispensers shall be located in the open space where they will be adequately ventilated.
- 3.6.2. The dispensers shall maintain a minimum distance of 6 mtrs. from any above-ground structure / property boundary.
- 3.6.3. The dispenser shall be installed on a firm foundation and protected against physical damage from vehicles.
- 3.6.4. A shear valve to be provided in dispensers in a pressurised system.
- 3.6.5. The length of the hose connected to the dispenser shall be kept

minimum keeping in view the operational requirement and shall not in any case exceed 4 m.

- 3.6.6. Breakaway coupling shall be installed in Dispensing Hose / nozzle,
- 3.6.7. The dispensing hose shall be electrically and mechanically continuous and earthed. Necessary provisions shall be available in Dispenser to earth the receptacles other than fuel tank of vehicles while dispensing.

3.7. Decantation locations

- 3.7.1. The road tanker delivery locations for unloading into storage tanks shall be in the open, away from the sales building, dispensing activities and emergency escape routes.
- 3.7.2. The hose used shall conform to OISD-STD-135.
- 3.7.3. Hose length shall not be more than 5.5 m.
- 3.7.4. The location chosen shall allow the road tanker to gain access without the need to reverse on to the site.
- 3.7.5. The discharge area also needs to be substantially leveled but should also incorporate drainage arrangements to intercept largest possible likely spillage.

3.8. Sales room

- 3.8.1. Any building or room intended to serve as a control point for a retail outlet shall preferably be so located that an attendant in the sales room can see the forecourt and the dispensing area clearly.

3.9. Canopy

- 3.9.1. The canopy, if provided, for weather protection shall not adversely effect the ventilation or access to the equipment.
- 3.9.2. Canopy heights installed at fuel fore court shall have at least 300mm clearance from the maximum permitted height.
- 3.9.3. Wind and seismic load for the canopy design shall be considered as per IS: 875 and IS: 1893 respectively.
- 3.9.4. Canopy structure shall be properly earthed as per IS: 3043.

4. Electrical Power Distribution System

The following elements / components shall be considered in designing the Electrical Power Distribution system in a Retail Outlet.

- Total electrical load for the entire Retail Outlet
- Availability, Suitability & Reliability of the relevant agencies grid.
- Incase of power failure, back-up arrangements.

5. Elements of Protection

- 5.1.1 Protection shall be provided to guard against sudden failures viz. neutral disconnection and against overload, short-circuit & earth fault.
- 5.1.2. The motors shall be protected against short circuit and overload.

5.1.3. Protection shall be provided for variation in voltage, frequency and phase unbalance.

5.1.4. The Retail Outlet operating after sunset, emergency lighting with battery backup shall be provided near the dispenser, sales room and electrical room.

6. Earthing System

The earthing system shall be designed as per IS 3043 and following procedures shall be followed:-

- 6.1.1 All metallic structure, pipe fittings and enclosures of electrical equipments shall be connected to earth.
- 6.1.2. Equipment rated up to 230 V, 1-phase supply, the enclosure shall be grounded at least one point.
- 6.1.3. Equipment rated above 400 V, 3-phase supply, the enclosure shall be grounded at least at two separate points.
- 6.1.4. Two earth pits shall be provided for each of transformer / DG set neutral earthing, equipment earthing.
- 6.1.5. All earthing pits except DG neutral and instrument / IT earthing shall be connected through grid (s).
- 6.1.6. In lightning prone areas, a risk assessment shall be carried out for need of lightning protection and guidelines given in IS 2309 shall be followed.

7. Emergency Stop System

- 7.1.1. Emergency stop system shall be provided to cut off the power

supply to all metering pumps/ dispensing equipment and associated equipment, other than certified intrinsically safe equipment at Sales Building. On actuating any of these push buttons, electrical power supply to entire PRO shall be isolated instantaneously.

8. OPERATING PROCEDURES

General

- 8.1.1. Operating personnel of retail outlet shall possess adequate knowledge and experience of handling MS/ HSD to ensure functioning of the station in a safe and efficient manner.
- 8.1.2. During unloading of the product from the tank truck to the bulk storage vessels, the tank truck shall be parked in the space marked for the purpose.
- 8.1.3. Operation of dispensing fuel to motor vehicles shall be suspended during the period of unloading of fuel from tank truck to the storage tanks.
- 8.1.4. All operations at Retail Outlet shall be suspended during the period of evacuation of the storage tank for maintenance and testing.
- 8.1.5. MS/ HSD shall not be filled in the fuel tank of motor vehicle while the engine of the vehicle is running.
- 8.1.6. The operating procedures shall be displayed at relevant locations for the unloading of tank truck.
- 8.1.7. Dos and Don'ts shall be prominently displayed in Retail Outlet.

8.1.8. Action in the event of emergency shall be clearly established and understood by all concerned and displayed prominently.

8.1.9. The following are the critical activities ;

- a. Decantation
- b. Management of the Forecourt / Fuelling area
- c. Sampling

9. Decantation of Tank Lorries

On receipt of Tank lorry from the supply point, Dealer or his authorized representatives shall check seals; match the numbers with the supply point documents, number of compartments and quantity/ product contained therein. The unloading operations shall be done in presence of the authorised person at Retail Outlet & Tank Truck Crew.

After decanting the product into the tank, at least 50 liters of product should be dispensed through the pump before taking sample from the pump nozzle for ascertaining the density of the product in the storage tank after receipt. The density at 150C thus ascertained should be recorded in the density register.

10. Forecourt Management

- 10.1.1. Guide the vehicle to the position at the designated area of the retail outlet facing the direction of exit.
- 10.1.2. Do not leave the vehicle unattended during refueling operation.
- 10.1.3. Ensure that sources of ignition, such as pilot lights, electrical ignition devices, electrical appliances/ gadgets, and engines located on the vehicle being refueled are turned off before

dispensing of fuel to a vehicle.

- 10.1.4. Delivery Sales Person must show zero setting to the motorist before commencing delivery.
- 10.1.5. Deliver product to customer as required.
- 10.1.6. After completion of delivery, remove nozzle and place it on the Pump boot.
- 10.1.7. Position the next vehicle and repeat all steps as above.
- 10.1.8. At the end of the day's work, ensure that valves are closed, hoses are properly stowed and electrical equipment is switched off.
- 10.1.9. Always guide all vehicles entering into the retail outlets to designated area for refueling.
- 10.1.10. Important operational activities shall be logged and records of such activities highlighting receipt, inventory, level, pressure, temperature, equipment running etc shall be maintained.
- 10.1.11. A two-wheeler shall be re-fueled only after the Riders have dismounted.

11. Sampling

- 11.1.1 The samples shall be taken in approved containers duly earthed/ bonded in line with the industry guidelines.
- 11.1.2 The samples shall be stored at designated approved place

11.1.3 The samples shall not be poured back directly to the storage tank.

11.1.4 The samples shall be collected in a separate receptacle for each product and transfer to storage tank through a container fitted with hose. The retail outlet operations shall be suspended during this transfer.

12. INSPECTION

12.1.1. A well designed system of periodic inspection of all facilities of retail outlet shall be formulated to maintain it in safe operable condition all the time.

12.1.2. Safety audit of the retail outlet shall be undertaken & certificate of fitness declaring integrity with respect to equipment, facilities, operations & safety procedures shall be accordingly issued.

12.1.3. All recommendations of the safety audit/ inspections shall be complied in a time bound manner and records maintained thereof.

12.1.4. The system of permit to work shall be established for non-routine works with and such works shall be undertaken with full knowledge and approval by authorised person.

12.1.5. Checklist shall cover conformity with the design intention, operating and maintenance procedures, preventive measure & protection systems and safety practices.

12.1.6. The earthing resistance shall be checked at least once a year and records maintained thereof.

