



## **CYLINDER RECIRCULATION MODEL (CRM)**

### **GUIDELINES FOR TRANSPORTATION OF LPG CYLINDERS**

May 2023

## Contents

1. General Conditions .....	2
2. Types of Vehicles .....	3
2.1 Category A - Bottling Plant to Cylinder Depots and Cylinder Exchange Points .....	3
2.2 Category B - Cylinder Depots to Cylinder Exchange Points and Resellers .....	3
2.3 Category C - Cylinder Exchange Point to Resellers and End User .....	5
3. Drivers and Riders Training .....	6
4. Emergency Response .....	6
5. Loading and Unloading .....	7
6. Return of defective/ leakage cylinders.....	7
7. Maintenance and Inspection .....	7
Appendix: Inspection Checklist for Cylinder Transportation Truck.....	9
References: Local Laws and Regulations for Road Safety and Motor Vehicles .....	14

## 1. General Conditions

Transporting LPG cylinders is a safety-critical activity. It is also a major expenditure item for the stakeholders involved in distributing cylinders in the LPG business. Choosing the right vehicle will ensure the safe, efficient, and cost-effective transportation of cylinders throughout the entire distribution chain. The following guiding principles or points shall be considered when operating vehicles for carrying LPG cylinders:

- 1.1 Gas cylinders shall be transported in open-cage vehicles or trailers.
- 1.2 Cylinders shall not be transported in a poorly ventilated cargo unit.
- 1.3 The bed of the vehicle shall be made of non-spark or flame-retardant materials such as aluminium or stainless steel or wood (treated or seasoned).
- 1.4 The vehicle shall be affixed with emergency phone numbers as well as safety signage marked “Danger! No smoking - No naked flame” printed in black on a yellow background including hazmat signage on all sides of the vehicle.
- 1.5 All vehicles shall carry 2No. 9 kg Dry Chemical Powder (DCP) fire extinguishers at either side of the trucks and 1No. 5 kg CO<sub>2</sub> fire extinguisher inside the cabin. They shall be kept in a serviceable condition with a service tag, protected against the effects of the weather and shall be easily accessible to the vehicle crew. Vehicle crew members shall be trained in the use of such equipment. The minimum certification required is a fire training certificate.
- 1.6 Pallets or cages shall be made of non-spark materials such as stainless steel or aluminium.
- 1.7 Pallets or cages shall be sized to contain not more than one stack of cylinders with boards in between rows of cylinders to prevent chafing or friction.
- 1.8 Cylinders shall be secured in place to prevent movement during transportation.
- 1.9 Tricycle (“Aboboya”) for transportation of cylinders from exchange points to consumers could be used. However, there should be stringent measures or conditions to assure safety.
- 1.10 At any given time, the transporter shall have a minimum crew of 2 persons on board.
- 1.11 All junction boxes shall be properly sealed (seal proof) - Any loose electrical wiring/ terminal is not acceptable.
- 1.12 Electrical wiring shall be insulated and provided with suitable over current protection.
- 1.13 Under no circumstances should the truck be pushed to start or jump start when loaded with filled cylinders.
- 1.14 Double pole master cut-off switch of adequate rating for switching off the engine to be provided inside the cabin in a readily accessible position.

## 2. Types of Vehicles

### 2.1 Category A - Bottling Plant to Cylinder Depots and Cylinder Exchange Points

Open-cage vehicles or long trailers may be used. The following are required:

- a) The vehicle shall have a gas-tight bulkhead separating the driver from the cage.
- b) Cylinders that do not exceed 14.5 kg shall be stacked vertically (but should not exceed a total height of 1.5 m), provided the cylinder design caters for such stacking.
- c) Stacked pallets or cylinders shall not project more than 0.5 m above the cabin.
- d) Vehicle shall be equipped with;
  - i. 2No. 9 kg DCP fire extinguisher;
  - ii. 1No. 5 kg CO<sub>2</sub> extinguisher for the cabin;
  - iii. 2 wheel chocks; iv. First aid box



Fig. 1. Open Cage Trailer for Bottling Plant to Cylinder Depot/ Cylinder Exchange Point Transportation

### 2.2 Category B - Cylinder Depots to Cylinder Exchange Points and Resellers

Vehicles in this category shall be open-cage light vehicles or semi-trailers. The following are required:

- a) Vehicle shall be equipped with
  - a. 2No. 9 kg DCP fire extinguisher
  - b. 2-wheel chocks
  - c. First aid box



Fig. 2. Open Cage Semi-Trailer for Cylinder Depots to Cylinder Exchange Points and Resellers



Fig. 3. Light Open Cage Vehicle for Cylinder Exchange Point to Resellers and End User Transportation

### 2.3 Category C - Cylinder Exchange Point to Resellers and End User

Vehicles in this category include light open cage vehicles including tricycles for exchange point to end user transportation or home deliveries. The following are required:

- a. The “bucket” of the tricycle shall be redesigned in a form of a cage to secure the cylinders.
- b. They shall have side mirrors.
- c. They shall have 1No. 9 kg fire extinguisher.
- d. The tricycles shall be roadworthy and have appropriate insurance coverage.
- e. The tricycles may be branded for identification.
- f. They shall operate within communities.
- g. Riders shall be provided with requisite training.
- h. Riders shall be provided with appropriate Personal Protection Equipment (PPE).



Fig. 4. Tricycles (“Aboboya”) for Cylinder Exchange Point or Reseller to End User Transportation

### **3. Drivers and Riders Training**

3.1 Drivers and Riders shall be trained and be familiar with activities that include:

- a. Knowledge about LPG and its properties;
- b. Pre-trip inspection;
- c. Operation of the vehicle;
- d. Use of vehicle controls and equipment;
- e. Operation of emergency equipment;
- f. Defensive driving techniques;
- g. Manual handling of cylinders;
- h. Requirements for reporting incidents;
- i. Loading and Unloading procedures.

3.2 Personnel engaged in transporting LPG cylinders shall be made aware of the hazards on board and the potential consequence of an incident on the road. They shall be trained on the following:

- i. Main characteristics of LPG which affect safe handling;
- ii. procedures for dealing with emergencies;
- iii. Proper operation of LPG vehicles; and
- iv. Company's safety requirements and operating procedures.

3.3 Drivers must be recruited based on their competence and relevant experience particularly if they are assigned to drive cylinder trucks.

### **4. Emergency Response**

4.1 The vehicle must also be equipped with a first-aid kit and 2No. 9 kg DCP fire extinguishers and 1No.5 kg CO<sub>2</sub> fire extinguisher in an easily accessible and removable position. The truck number, the last date of servicing and charging should be indicated on the fire extinguisher.

4.2 If a leak occurs the cylinder shall be isolated, and contain the situation to ensure the leak stops if possible. If it cannot be stopped, the cylinder shall be isolated further from people, buildings, drains and sources of ignition. Remove any ignition sources. If possible, seek support from the emergency services on 112.

## 5. Loading and Unloading

Loading and unloading cylinders from vehicles must be carried out without risk of injury to personnel and damage to cylinders and vehicles. The following guidelines are good practices:

- a. Vehicles must not be overloaded by weight or volume;
- b. Cylinders must never be dropped or thrown onto or off the vehicle when they are being manually loaded or unloaded;
- c. They must never be rolled horizontally along the ground;
- d. Cylinders can be rolled on the foot ring or moved in a properly designed pushcart;
- e. Cylinders that are not equipped with a permanently fitted shroud must be fitted with removable safety caps when being transported to protect the valve;
- f. Cylinders (full or partially empty) must be loaded with their valves always in the upright position to ensure that the pressure relief valve (if provided) is in contact with the vapour space and to avert liquid leak or discharge when under excessive pressure;
- g. Cylinder stacks should be stable, and stacks should not be higher than what the restraints can secure; and
- h. Quality and quantity check before unloading.

## 6. Return of defective/ leakage cylinders

The defective cylinders can only be transported using approved cylinder transportation trucks. Marketers will be responsible for transporting defective cylinders from bottling plants/distribution centres/ exchange points to manufacturing plants.

## 7. Maintenance and Inspection

7.1 All vehicles carrying LPG cylinders must be subjected to regular inspection and maintenance to keep them in good running order and to avoid unplanned maintenance.

7.2 The maintenance schedule should follow the recommendations of the original vehicle manufacturer. A record of the maintenance conducted shall be kept for each vehicle for future reference.

7.3 Aside from regular maintenance, vehicles shall be subjected to daily inspection checks before they leave their base.



7.4 The driver must conduct this inspection to check if the vehicle is roadworthy and compliant with the requirements for the safe transportation of cylinders. Inspection items to be checked include:

- a. Tyres which are to be correctly inflated and have sufficient tread depth;
- b. Foot brake, hand brake or operational and air pressures;
- c. Levels of engine oil, radiator coolant, and screen wash;
- d. Horn, lights, and windshield wipers are all in good working condition;
- e. Fire extinguishers are sealed and fitted in readiness for use, are easily accessible and within test date;
- f. Fire extinguishers must also bear a mark of compliance and an inscription indicating the date of next inspection; and
- g. Seatbelts are in good condition and operational.

## Appendix: Inspection Checklist for Cylinder Transportation Truck

SAFE TO LOAD (LPG CYLINDERS TRUCK)		
Inspector Name:		Place of Control:
Date:	Time:	Product:
Transporter:		Driver Name:
Truck/Prime mover ID:		
Trailer ID:		Truck/Prime mover kilometres:
General condition		Checks
1 Last technical Inspection (vehicle inspection company/DVLA)		
2 Visibility (functional wiper)		
3 Safety belt (3 fastening points)		
4 Lighting		
5 Fire extinguishers		
6 Wheels/rims		
7 Tyres		
8 Fifth wheel and king pin (for semi-trailer and trailer hitch)		
9 Brake testing		
10 Marking and stickers		
11 Emergency phone number		
12 Functional horn		



Truck equipment		Checks
13 Proper closing and fastening of the back and/side doors		
14 Condition of bed/floor		
15 Presence and strength of side walls or general condition of the cage		
16 Lashing straps and/or blocking boards		
17 Battery cut off switch (cabin or outside)		
18 Wheel chocks		
19 2 early warning devices: (triangles, cones)		

Driver	Blocking points	Checks
20 Driver's accreditation/license		
21 Driver PPE		

Comments:

Approved vehicle: ☐ Yes ☐ No

Signature of inspector	Signature of driver
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**References: Local Laws and Regulations for Road Safety and Motor Vehicles**

1. Axle Load Limits 2012 (LI 2180) Regulations 86-99: maximum gross vehicles weight limits from 51 tons to 68 tons.
2. Road Traffic (Amendment) Regulations 1995, LI952, LI953.

