

Preliminary Gas Safety Requirements for LPG Vehicle Workshop

1. Statutory Requirements

- 1.1 An LPG vehicle workshop is classified as a Notifiable Gas Installation and regulated under the Gas Safety Ordinance, Cap 51. As such, the owner of an LPG vehicle workshop is required to apply for construction and use approval from the Gas Authority (i.e. the Director of Electrical and Mechanical Services) for compliance with the necessary safety and ventilation requirements.
- 1.2 The owner of an LPG vehicle workshop has a responsibility to ensure that the workshop and the equipment therein are operated and maintained in a safe manner, and has adequate number of competent persons to carry out repair and maintenance work of LPG vehicles. Motor mechanics, who have successfully completed LPG vehicle training courses, would be assessed by the Gas Authority for enlisting as competent persons.

2. Scope

This document sets out the gas safety requirements of facilities and precautions for an LPG vehicle workshop including any work on LPG vehicles carried out in the workshop.

3. Location

- 3.1 An LPG vehicle workshop shall be readily accessible in a well-ventilated area at ground level, and never below cellars or in basements. A workshop located at upper floors may be considered under special circumstances with a well ventilated access road.
- 3.2 An LPG vehicle workshop should not be located in the same building of residential accommodation.
- 3.3 Drains or unventilated pits shall be avoided in the workshop floor area or in the immediate vicinity of the workshop. Where a gully or drain is unavoidable, the opening shall either be securely covered or the drain suitably sealed.
- 3.4 Adequate area shall be provided for repairing and maintenance of LPG vehicles. The perimeter of the workshop area shall be marked conspicuously on the ground.
- 3.5 Warning signs showing “LPG Vehicle Workshop／石油氣車維修工場” and “No Smoking／不准吸煙” shall be prominently displayed at the workshop area.

4. Ventilation

4.1 General

- 4.1.1 The design of an LPG vehicle workshop shall be such that occurrence of a build-up of an LPG/air mixture above the lower flammable limit is minimised by provision of adequate ventilation.
- 4.1.2 Wherever possible, adequate natural ventilation should be provided, but where adequate natural ventilation is unattainable, mechanical ventilation shall be provided as an alternative.
- 4.1.3 An LPG vehicle workshop shall be ventilated utilising air inlets and outlets arranged to provide air movement across the floor as uniformly as practicable and in accordance with Sections 4.2 and 4.3.
- 4.1.4 Ventilation apertures and/or ducts shall be positioned in such a way so as to prevent accumulation of LPG.

4.2 Natural Ventilation

- 4.2.1 Apertures for natural ventilation shall be situated in external walls of an LPG vehicle workshop such that:-
- (i) the bottoms of low level ventilation apertures are not more than 150 mm above the floor;
 - (ii) the tops of high level ventilation apertures are not more than 500 mm below the ceiling;
 - (iii) the effective low level ventilation area is within 500 mm from the floor; and
 - (iv) the effective high level ventilation area is within 1000 mm from the ceiling.
- 4.2.2 Ventilation apertures shall be provided with a total effective area of at least 0.03 m² per m² of floor area at low level and 0.015m² per m² of floor area at high level.
- 4.2.3 Ventilation apertures shall be at least 1 m from openings into other buildings or any fixed source of ignition.

4.3 Mechanical Ventilation

- 4.3.1 A minimum ventilation capacity of 500 litre/s per vehicle shall be provided for mechanical ventilation systems in the workshop area.
- 4.3.2 The airflow velocity within any exhaust duct of the ventilation system shall not be less than 5 m/s.
- 4.3.3 The inlet apertures of the ventilation duct system shall be located at not more than 150 mm above the floor level.
- 4.3.4 The outlet of the ventilation system shall discharge at least 1.5 m away from any opening into the workshop, adjacent buildings, or any fixed source of ignition.

- 4.3.5 A clearance of 150 mm shall be maintained around the air intakes of the ventilation system to prevent blockage of the inlet openings.
- 4.3.6 All electrical apparatus for a mechanical ventilation system shall be of a flameproof type and be suitable for use in Zone 1 hazardous areas in compliance with BS 5345 or equivalent.
- 4.3.7 An audio and visual alarm system indicating failure of the mechanical ventilation system such as interruption of electrical supply, failure of extraction fan, etc. shall be provided for the system. Emergency procedures in response to the alarm shall be prominently displayed in the workshop area.
- 4.3.8 The ventilation system shall be started before the work commences and be kept operating whilst the work is in progress.

5. Gas Detection System

- 5.1 Gas detectors shall be calibrated for detection of LPG and be located at not more than 150 mm above the floor level around the workshop.
- 5.2 A gas detection system shall provide an audible and visual alarm, if there is a flammable gas mixture with concentration reaching 20% of the lower flammable limit.
- 5.3 The detection system shall be capable of activating the mechanical ventilation system if the system is not switched on.

6. Fire Protection

- 6.1 At least 2 fire extinguishers of dry powder type shall be provided at the workshop.
- 6.2 Other fire services requirements shall be adhered to as may be stipulated by the Director of Fire Services.

7. Safety Precautions

- 7.1 Inside the workshop, unless a vehicle has been tested and a leak-free condition has been verified:-
- (i) the space in the vicinity of 3 m from the perimeter of the vehicle to a height of 1 m above the highest point of the LPG fuel system should be classified as Zone 1;
 - (ii) ignition sources shall be kept out of the hazardous zone; and
 - (iii) the gas outlet valve of the LPG cylinder shall be closed at all times, except when checking or testing is being carried out which requires the gas.
- 7.2 Heating (including heat treatment after paint re-spraying), welding, or flame cutting shall not be carried out within 1m of the LPG cylinder.

- 7.3 All electrical installations or appliances for use in Zone 1 area shall be of flameproof type in compliance with BS 5345 or equivalent.
- 7.4 No smoking is allowed in the workshop area.
- 7.5 Portable combustible gas detectors shall be kept readily available for gas leak detection.

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