

## SCHEDULE 5

(see regulations 49 and 111(4))

### Gas Systems

#### Definitions

1. In this Schedule—

“check valve” means a device which permits the flow of gas in one direction and prevents the flow of gas in the opposite direction;

“design pressure” means the pressure which a part of a gas system has been designed and constructed safely to withstand;

“double-check valve” means a device which consists of two check valves in series and which permits the flow of gas in one direction and prevents the flow of gas in the opposite direction;

“excess flow valve” means a device which automatically and instantaneously reduces to a minimum the flow of gas through the valve when the flow rate exceeds a set value;

“fixed gas container” means a gas container which is attached to a vehicle permanently and in such a manner that the container can be filled without being moved;

“gas container” means a container, not being a container for the carriage of gas as goods, which is fitted to or carried on a motor vehicle or trailer and is intended for the storage of gas for either—

(a) the propulsion of the motor vehicle, or

(b) the operation of a gas-fired appliance;

“high pressure” means a pressure exceeding 1.0325 bar absolute;

“high pressure pipeline” means a pipeline intended to contain gas at high pressure;

“pipeline” means a pipe or passage connecting any two parts of a gas propulsion system of a vehicle or of a gas-fired appliance supply system on a vehicle or any two points on the same part of that system;

“portable gas container” means a gas container which may be attached to a vehicle but which can readily be removed;

“pressure relief valve” means a device which opens automatically when the pressure in the part of the gas system to which it is fitted exceeds a set value, reaches its maximum flow capacity when the set value is exceeded by 10% and closes automatically when the pressure falls below a set value; and

“reducing valve” means a device which automatically reduces the pressure of the gas passing through it, and includes regulator devices.

#### Gas containers

2.—(1) A gas container shall—

(a) be capable of withstanding the pressure of the gas which may be stored in the container at the highest temperature which the gas is likely to reach,

(b) if fitted inside the vehicle, be so arranged as to prevent, so far as is practicable, the possibility of gas entering the engine, passenger or living compartments due to leaks or venting from the container or valves, connections and gauges immediately adjacent to it, and the space containing these components shall be so ventilated and drained as to prevent the accumulation of gas,

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- (c) be securely attached to the vehicle in such a manner as not to be liable to displacement or damage due to vibration or other cause, and
  - (d) be so placed and so insulated or shielded as not to suffer adverse effect from the heat of the exhaust system of an engine or other source of heat.
- (2) A portable gas container shall be either—
- (a) hermetically sealed, or
  - (b) fitted with a valve or cock to enable the flow of gas from the container to be stopped.
- (3) A fixed gas container shall—
- (a) be fitted with—
    - (i) at least one pressure relief valve, and
    - (ii) at least one manually operated valve which may be extended by an internal dip tube inside the gas container so as to indicate when the container has been filled to the level corresponding to the filling ratio specified in the British Standards Institution Specification for Filling Ratios and Developed Pressure for Liquefiable and Permanent Gases (as defined, respectively, in paragraphs 3.2 and 3.5 of the said Specification) published in May 1976 under the number BS 5355, and
  - (b) be conspicuously and permanently marked with its design pressure.
- (4) If a fixed gas container is required to be fitted in a particular attitude or location, then it shall be conspicuously and permanently marked to indicate that requirement.
- (5) If the operation of a pressure relief valve referred to in sub-paragraph (3) may cause gas to be released from the gas container, an outlet shall be provided to lead the gas to the outside of the vehicle so that the outlet shall not suffer any adverse effect from the heat of the exhaust system of an engine or other source of heat, and that outlet from the pressure relief valve shall not be fitted with any other valve or cock.

#### **Filling systems for fixed gas containers**

- 3.—(1) A connection for filling a fixed gas container shall be on the outside of the vehicle.
- (2) There shall be fitted to a fixed gas container either—
- (a) a manually operated shut-off valve and an excess flow valve, or
  - (b) a manually operated shut-off valve and a single check valve, or
  - (c) a double-check valve,
- and all parts of those valves in contact with gas shall be made entirely of suitable metal except that they may contain non-metal washers and seals provided that such washers and seals are supported and constrained by metal components.
- (3) Where a pipe is attached to a gas container for the purpose of filling the gas container there shall be fitted to the end of the pipe furthest from the gas container a check valve or a double-check valve.
- (4) There shall be fitted over a gas filling point on a vehicle a cap which shall—
- (a) prevent leakage of gas from the gas filling point,
  - (b) be secured to the vehicle by a chain or some other suitable means,
  - (c) be made of suitable material, and
  - (d) be fastened to the gas filling point by either a screw thread or other suitable means.

## **Pipelines**

- 4.—(1) A pipeline shall be fixed in such a manner and position that—
- (a) it will not be adversely affected by the heat of the exhaust system of any engine or any other source of heat,
  - (b) it is protected from vibration and strain in excess of that which it can reasonably be expected to withstand, and
  - (c) in the case of a high pressure pipeline it is so far as is practicable accessible for inspection.
- (2) Subject to sub-paragraph (4) a high pressure pipeline shall be—
- (a) a rigid line of steel, copper or copper alloy of high pressure hydraulic grade, suitable for service on road vehicles and designed for a minimum service pressure rating of not less than 75 bar absolute, and
  - (b) effectively protected against, or shielded from, or treated so as to be resistant to, external corrosion throughout its length unless it is made from material which is corrosion resistant under the conditions which it is likely to encounter in service.
- (3) No unsupported length of any high pressure pipeline shall exceed 600mm.
- (4) Flexible hose may be used in a high pressure pipeline if—
- (a) it is reinforced either by stainless steel wire braid or by textile braid,
  - (b) its length does not exceed 500mm, and
  - (c) save in the case of a pipeline attached to a gas container for the purpose of filling that container the flexibility which it provides is necessary for the construction or operation of the gas system of which it forms a part.
- (5) If a high pressure pipeline or part of such a pipeline is so constructed or located that it may, in the course of its normal use (excluding the supply of fuel from a gas container), contain liquid which is prevented from flowing, a relief valve shall be incorporated in that pipeline.

## **Unions and joints**

- 5.—(1) Unions and joints on a pipeline or gas container shall be so constructed and fitted that they will—
- (a) not be liable to work loose or leak when in use, and
  - (b) be readily accessible for inspection and maintenance.
- (2) A union on a high pressure pipeline or on a gas container shall be made of suitable metal but such a union may contain non-metal washers and seals provided that such washers and seals are supported and constrained by metal components.

## **Reducing valves**

6. A reducing valve shall be made of suitable materials and be so fitted as to be readily accessible for inspection and maintenance.

## **Pressure relief valves**

- 7.—(1) A pressure relief valve which is fitted to a part of a gas system (including a gas container) shall—
- (a) be made entirely of suitable metal and so constructed and fitted as to ensure that the cooling effect of the gas during discharge shall not prevent its effective operation,

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- (b) be capable, under the most extreme temperatures likely to be met (including exposure to fire), of a discharge rate which prevents the pressure of the contents of the gas system from exceeding its design pressure,
  - (c) have a maximum discharge pressure not greater than the design pressure of the gas container,
  - (d) be so designed and constructed as to prevent unauthorised interference with the relief pressure setting during service, and
  - (e) have outlets which are—
    - (i) so sited that so far as is reasonably practicable in the event of an accident the valve and its outlets are protected from damage and the free discharge from such outlets is not impaired, and
    - (ii) so designed and constructed as to prevent the collection of moisture and other foreign matter which could adversely affect their performance.
- (2) The pressure at which a pressure relief valve is designed to start lifting shall be clearly and permanently marked on such valve.
- (3) A pressure relief valve which is fitted to a gas container shall communicate with the vapour space in the gas container and not with any liquefied gas.

#### **Valves and cocks**

- 8.—(1) A valve or cock shall be fitted to a supply pipeline as near as practicable to a fixed gas container and such valve or cock shall by manual operation enable the supply of gas from the gas container to the gas system to be stopped, and subject to sub-paragraph (2), shall—
- (a) if fitted on the outside of the vehicle, be readily visible and accessible from the outside of the vehicle, or
  - (b) if fitted inside the vehicle be readily accessible for operation and be so arranged as to prevent so far as is practicable the possibility of gas entering the engine, passenger or living compartments due to leaks, and the space containing the valve or cock shall be so ventilated and drained as to prevent the accumulation of gas in that space.
- (2) Where a fixed gas container supplies no gas system other than a gas propulsion system and the gas container is so located that it is not practicable to make the valve or cock referred to in sub-paragraph (1) readily accessible there shall be fitted an electrically-operated valve which shall either be incorporated in the valve or cock referred to in sub-paragraph (1) or be fitted immediately downstream from it and shall—
- (a) be constructed so as to open when the electric power is applied and to close when the electric power is cut off,
  - (b) be so fitted as to shut off the supply of gas from the gas container to the gas system when the engine is not running, and
  - (c) if fitted inside the vehicle be so arranged as to prevent as far as is practicable the possibility of gas entering the engine, passenger or living compartments due to leaks, and the space containing the valve shall be so ventilated and drained as to prevent the accumulation of gas in that space.
- (3) A notice clearly indicating the position, purpose and method of operating a valve or cock referred to in sub-paragraphs (1) and (2) shall be fixed—
- (a) in a conspicuous position on the outside of the vehicle, and
  - (b) where the valve or cock is located inside the vehicle in a conspicuous position adjacent to the gas container.

(4) In the case of a high pressure pipeline for the conveyance of gas from the gas container an excess flow valve shall be fitted as near as practicable to the gas container and such valve shall operate in the event of a fracture of the pipeline or other similar failure.

(5) All parts of every valve or cock referred to in this sub-paragraph which are in contact with gas shall be made of suitable metal, save that they may contain non-metal washers and seals if such washers and seals are supported and constrained by metal components.

### **Gauges**

9.—(1) Subject to sub-paragraph (2) a gauge connected to a gas container or to a pipeline shall be so constructed as to be unlikely to deteriorate under the action of the gas used or to be used and shall be so constructed and fitted that—

- (a) no gas can escape into any part of the vehicle as a result of any failure of the gauge, and
- (b) in the event of a failure of the gauge the supply of gas to the gauge can be readily stopped.

(2) Sub-paragraph (b) shall not apply to a gauge fitted as an integral part of a gas container.

### **Propulsion systems**

10.—(1) A gas propulsion system shall be so designed and constructed that—

- (a) the supply of gas to the engine is automatically stopped by the operation of a valve when the engine is not running at all or is not running on the supply of gas, and
- (b) where a reducing valve is relied on to comply with sub-paragraph (a), the supply of gas to the engine is automatically stopped by the operation of an additional valve when the engine is switched off.

(2) Where the engine of a vehicle is constructed or adapted to run on one or more fuels as alternatives to gas, the safety and efficiency of the engine and any fuel system shall not be impaired by the presence of any other fuel system.

### **Special requirements for buses**

11. In the case of a bus there shall be fitted as near as practicable to the gas container a valve which shall stop the flow of gas into the gas supply pipeline in the event of—

- (a) the angle of tilt of the vehicle exceeding that indicated in regulation 4 of the Public Service Vehicles (Conditions of Fitness, Equipment and Use) Regulations (Northern Ireland) 1995(1), and
- (b) the deceleration of the vehicle exceeding 5g.

### **Gas-fired appliances**

12. All parts of a gas-fired appliance shall be—

- (a) so designed and constructed that leakage of gas is unlikely to occur, and
- (b) constructed of materials which are compatible both with each other and with the gas used.

13. A gas-fired appliance shall be—

- (a) so located as to be easily inspected and maintained,
- (b) so located and either insulated or shielded that its use shall not cause or be likely to cause danger due to the presence of flammable material,

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(1) [S.R. 1995 No. 447](#), to which there are amendments not relevant to these Regulations

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- (c) so constructed and located as not to impose undue stress on pipes or fittings, and
- (d) so fastened or located as not to work loose or move in relation to the vehicle.

14. With the exception of catalytic heating appliances, an appliance of the kind described in regulation 111(3)(b) or (c) which is fitted to a motor vehicle shall be fitted with a flue which shall be—

- (a) connected to an outlet which is on the outside of the vehicle,
- (b) constructed and located so as to prevent expelled matter from entering the vehicle, and
- (c) located so that it will not cause adverse effect to, or suffer adverse effect from, the exhaust outlet of the engine or other source of heat.

### **General requirements**

15. All parts of a gas propulsion system or a gas-fired appliance system, excluding the appliance itself, shall be—

- (a) so far as is practicable so located or protected as not to be exposed to accidental damage,
- (b) soundly and properly constructed of materials which are compatible with one another and with the gas used or to be used and which are capable of withstanding the loads and stresses likely to be met in operation, and
- (c) so designed and constructed that leakage of gas is unlikely to occur.