

GAS CYLINDERS RULES, 1981

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CHAPTER I

Preliminary

1. Short title and commencement -

- (1) These rules may be called the Gas Cylinders Rules, 1981.
- (2) They shall come into force on the date of their publication in the Official Gazette.

2. Definition - In these rules unless the context otherwise requires,--

- (i) "Act" means the Indian Explosives Act, 1884 (4 of 1884);
- (ii) "Chief Controller" means the Chief Controller of Explosives, Government of India;
- (iii) "Competent person" means a person recognised by the Chief Controller to be a competent person, or a person who holds a certificate of competency for the job
- (iv) "compressed gas" means any permanent gas, liquefiable gas or gas dissolved in liquid under pressure or gas mixture which in a closed gas cylinder exercises a pressure or gas mixture which in a closed gas cylinder exercise a pressure either exceeding 2.5 Kgf/Cm² abs (1.5 Kgf/ Cm² gauge) at +150 C or a pressure exceeding 3Kgf/ Cm² abs (2 Kgf/ Cm² gauge) at + 500 C or both.
Explanation.-Hydrogen Fluoride falls within the scope of compressed gas although its vapour pressure at 500 C is 1.7 to 1.8 atmospheric gauge;
- (v) "Conservator" in relation to a port includes any person acting under the authority of the officer or body of person appointed to be Conservator of that port under Section 7 of the Indian Ports Act, 1908 (15 of 1908);
- (vi) "Controller of Explosives" includes the Jt. Chief Controller of Explosives, Deputy Controller of Explosives and Assistant Controller of Explosives;
- (vii) "critical temperature" means the temperature above which gas cannot be liquefied by the application of pressure alone;
- (viii) "dissolved acetylene cylinder" means a cylinder having a valve and with or without safety devices, containing a porous mass, a solvent for the storage of dissolved acetylene and at least sufficient acetylene to saturate the solvent at atmospheric pressure and at a temperature of 150 C.
Explanation.-Acetone or any other solvent used shall not be capable of chemical reaction with the acetylene gas or with the porous mass or with the metal of the cylinder or valve;
- (ix) "dissolved gas" means a gas which under pressure is dissolved in a fluid solvent appropriate to the particular gas as for example, acetylene in acetone or ammonia in water;
- (x) "district authority" means-
 - (a) a Commissioner of Police or Deputy Commissioner of Police in any town having a Commissioner of Police; and
 - (b) in any other place, the District Magistrate;
- (xi) "District Magistrate" includes an Additional District Magistrate, and in the States of Punjab and Haryana and in the Karaikal, Mahe and Yanam areas of the Union Territory of Pondicherry, also includes a Sub-Divisional Magistrate;

- (xii) "filling pressure" means the maximum permissible gauge pressure, converted to + 150 C, at which a gas cylinder for permanent gas or gas dissolved under pressure can be filled;
- (xiii) "filling ratio" means the ratio of the weight of a liquefiable gas introduced in the cylinder to the weight of the water the cylinders will hold at 150 C;
- (xiv) "flammable gas" means any gas which, if either a mixture of 13 per cent or less (by volume) with air forms a flammable mixture or the flammability range with air is greater than 12 per cent regardless of the lower limit and these limits shall be determined at atmospheric temperature and pressure
Explanation.-"Flammability range" means the difference between the minimum and maximum percentages by volume of the gas in mixture with air that forms a flammable mixture;.
- (xv) "Form" means a Form set forth in Schedule V'
- (xvi) "Gas cylinder" or "cylinder means any closed metal container intended for the storage and transport of compressed gas, designed not to be fitted to a special transport or under-carriage, and having a volume exceeding 500 ml but not exceeding 1000 litres;
- (xvii) "high pressure liquefiable gas" means a liquefiable gas having a critical temperature between - 100 C and + 700 C.
- (xviii) "hydrostatic stretch test" means subjecting the cylinder to a hydrostatic pressure equal to the test pressure of the cylinder and recording the permanent stretch undergone by the cylinder;
- (xix) "hydrostatic test" means the test to which a cylinder is subjected to a hydrostatic pressure equal to the test pressure of the cylinder;
- (xx) "import " means bringing into India by land, sea or air;
- (xxi) "inspecting authority" means a person having qualifications and wide experience in the filed of design, manufacture and testing of gas cylinders and recognised by the Chief Controller as authority for inspection and certification of gas cylinder;
- (xxii) "installation" means any premises wherein any place has been specially prepared for the manufacture (filling) or storage of compressed gas cylinders;
- (xxiii) "liquefiable gas" means a gas that may be liquefied by pressure at -- 100 C but will be completely vaporised when in equilibrium with normal atmospheric pressure (760 mm. Hg) at 300 C;
- (xxiv) "low pressure liquefiable gas" means a liquefiable gas having critical temperature higher than + 700 C;
- (xxv) "manufacture of gas" means filling of a cylinder with any compressed gas and also includes transfer of compressed gas from one cylinder to any other cylinder;
- (xxvi) "permanent gas" means a gas whose critical temperature is below -- 100 C that is to say a gas which cannot be liquefied under any pressure at a temperature above -- 100 C;
- (xxvii) "Schedule" means the Schedule annexed to these rules;
- (xxviii) "tare weight" in relation to,
 - (1) acetylene cylinder means the weight of the cylinder together with any fittings, permanently attached and includes the weight of valve any safety device, porous mass, requisite quantity of solvent for dissolving acetylene, and the weight of acetylene gas saturating the solvent at atmospheric pressure and temperature of 150 C.
 - (2) liquefiable gas cylinder means the weight of the cylinder together with any fittings permanently attached thereto and includes the weight of valve.
 - (3) Permanent gas cylinder means the weight of the cylinder together with any fittings permanently attached thereto.
- (xxix) "test pressure" means the internal pressure required for the hydrostatic test or hydrostatic stretch test of the cylinder, as follows:--
 - (1) For permanent and high pressure liquefiable gases. It should be calculated from the following:
200. t. Re
Ph = -----

1.25 (Do-t)

where

Ph = Test pressure in Kgf/Cm²

Do= Outside diameter of the cylinder in mm.

t = Minimum calculated wall thickness of the cylinder shell in mm.

Re= Minimum specified yield strength of the material of cylinder in Kgf/mm².

It is limited to 75 per cent of the minimum value of the tensile strength for quenched and tempered cylinder, provided that the value of test pressure shall not exceed 80 per cent of the yield strength.

- (2) For low pressure liquefiable gas-One and a half times the saturated vapour pressure of the gas at 650C or as specified in IS:8867, whichever is higher.
- (xxx) "transport" means the moving of a cylinder filled with any compressed gas from one place to another;
- (xxxi) "water capacity" means the volume of water in litres, a cylinder will hold at 150 C.;
- (xxxii) "working pressure for low pressure liquefiable gas" means the saturated vapour pressure at 650 C;
Explanation.-For the values of saturated vapour pressure of different gases see IS:3710;
- (xxxiii) "working pressure for permanent gas" means the internal pressure of the gas in the cylinder at a temperature of 150 C;
- (xxxiv) "yield strength" means the stress corresponding to a permanent strain of 0.2 per cent of the original gauge length in a tensile test. For practical purpose it may be taken as a stress at which elongation first occurs in the test piece without the increase of load in a tensile test.

CHAPTER II

General Provisions

3. Filling, possession, import and transport of cylinders.-

- (1) No person shall fill any cylinder with any compressed gas or import, possess or transport any cylinder so filled or intended to be filled with such gas unless:--
- (a) such cylinder and its valve have been constructed to a type and standard specified in Schedule I as amended from time to time by an order issued by the Chief Controller;
- (b) the test and inspection certificates issued by the inspection authority in respect of cylinder and its valve are made available to the Chief Controller and prior approval of the said authority is obtained.
- (2) The test and inspection certificates required to be obtained from the inspecting authority in respect of cylinders and valves inspected and certified by it in accordance with the approved design and specification or code shall give the information included in Schedule II.
- (3) "Form" means a Form as given in the Second Schedule;
- (a) the cylinder has passed the hydrostatic test or hydrostatic stretch test, as the case may be, within the period specified in these rules and the pressure applied during the test shall be the test pressure marked on the cylinder;
- (b) the cylinder is not filled with-
- (i) any liquefiable gas in excess of the filling ratio specified in IS:3710;
- (ii) any permanent gas at a pressure in excess of the pressure for which the cylinder is designed;
- (c) a separate record of the cylinder tested and filled is maintained at the filling station;

- (d) the filled cylinders are removed from the filling station and shipped off as expeditiously as possible.

4. Valves.-

- (1) Valves fitted to gas cylinders shall comply in all respects with the following specifications namely:-
 - (a) in respect of industrial gas cylinders, IS:3224;
 - (b) in respect of medical gas cylinders, IS:3745;
 - (c) in respect of cylinders used with breathing apparatus, IS:7302 as amended from time to time;
 - (d) in respect of cylinders used for filling liquefied petroleum gas, IS:8776 for cylinders of water capacity not exceeding 5 litres and, IS: 8737 for cylinders of water capacity exceeding 5 litres:
Provided that the Chief Controller may, if he is of opinion that it is necessary so to do in the public interest, permit the use of valves not conforming to any of the specifications.
- (2) Valves fitted to Carbon Dioxide cylinders shall be provided in the body with a safety release consisting of softened copper disc so arranged as to burst at a pressure between 200 kg/cm².
- (3) Valves for cylinders containing flammable gases not listed in IS:3224 shall have outlets provided with left handed screw threads for the pipes or other connections.
- (4) All other valves shall have outlet with right-handed screw threads.
- (5) The valves shall be attached to the cylinder neck by screwing and not by making any permanent attachment or inserting adapter in between.
- (6) The design of spindle operated valves shall be such that when fitted to the cylinders it shall not be possible to withdraw the spindle under normal operating conditions.

5. Safety relief devices.-

- (1) Cylinders manufactured in India, if fitted with safety relief devices in their bodies, shall have such safety devices manufactured and maintained in accordance with IS:5903
- (2) Cylinders containing obnoxious or poisonous gases shall not be provided with any safety device.
Explanation.-For the purpose of this sub-rule, "obnoxious or poisonous gases" include Carbon Monoxide, Hydro-Cyanic Acid, Hydrogen Chloride, Hydrogen Bromide, Hydrogen Fluoride, Sulphur Dioxide, Chlorine, Methyl Bromide, Nitrogen Tetroxide, Nitrosyl Chloride, Town gas, Hydrogen Sulphide, Carbonyl Chloride (Phosgene), Cyanogen, Cyanogen Chloride, Fluorine and Carbon Oxychloride
- (4) Cylinders manufactured in foreign countries, approved for use in this country, if fitted with safety relief devices shall have these devices fully maintained in accordance with requirements of the specification to which they were originally made.

6. Marking on cylinders.-

- (1) Marking generally:
 - (a) Every gas cylinder shall be clearly and permanently marked in accordance with following conditions by stamping, engraving or similar processes:
 - (i) on the shoulder of the cylinder which shall be reinforced by forging or other means, or
 - (ii) on such a part which is inseparably bound with the cylinder and which is not or only negligibly affected by the stresses due to the gas pressure within it.
 - (b) The name plate shall not be affixed to the cylinder by soldering if there is a risk of corrosion or embrittlement.
 - (c) In conjunction with the original marking, space shall be provided for stamping the test date obtained at the periodic inspection.
 - (d) Markings shall be so carried out and the letters and numerals used shall be of such shape and size that the marking is clear and easily readable and does

not give place for misreading.

- (2) Marking on permanent and liquefiable gas cylinders:
- (a) Every cylinder shall be marked with the following markings, namely:--
- (i) Manufacturer's, owner's and inspector's marking and rotation number (these markings shall be registered with the Chief Controller);
 - (ii) specification to which the cylinder has been made;
 - (iii) a symbol to indicate the nature of heat treatment given to the cylinder during manufacture or after repairs;
 - (iv) the date of the last hydrostatic test or hydrostatic stretch test, as the case may be, with the code mark of recognised testing station where the test was carried out. The code mark shall be registered with the Chief Controller. In the case of liquefied petroleum gas cylinders, the quarter and the year of test shall be given as an additional marking in a neck or on a shoulder plate;
 - (v) working pressure and test pressure;
 - (vi) tare weight;
Explanation.-In the case of liquefiable gas cylinders, tare weight shall include the weight of valve fitted to the cylinder. The weight of the valve shall be indicated separately;
 - (vii) water capacity.
- (b) All the markings, except the manufacture's markings, which may be on the base, shall be stamped on the neck end of the cylinder.

7. Markings on valve.-Valves fitted to the cylinder shall be clearly and durably marked in accordance with the following provisions by stamping, engraving or similar processes:

- (i) the specification of the valves;
- (ii) year and quarter of manufacture;
- (iii) manufacturer's symbol;
- (iv) working pressure
- (v) the name or chemical symbol of the gas for which the valve is to be used;
- (vi) the type of screw threads on the outlet, namely left handed (L.H.) or right handed(R.H.);
- (vii) Inspector's stamp;
- (viii) Where dip tubes are provided, special indications shall be given by a clear and durable marking on the valve or on a badge fixed between the valve and the cylinder. The total length in mm. Of the tube shall also be indicated.

Identification colours.-

- (1) Every person filling any cylinder with any compressed gas shall, before it is stored or despatched, see that the cylinder is painted with appropriate identification colours specified in IS:4379 for industrial cylinders and IS:3933 for medical cylinders.
- (2) Cylinders used for new gases and gas mixtures for which identification colours are not provided in sub-rule (1) shall be painted with the colours indicated in the following table, namely:--

Name of the gas contained in the end of Cylinder	Colour of the cylinder shell	Colour of band at neck cylinder
1	2	3
Non-flammable and nontoxic	White	
Non-flammable but toxic colour	White	Yellow (IS Standard Colour No.356).
Flammable but nontoxic other Colour Than the LPG	White	Red (IS Standard Colour Than the LPG No.537).
Flammable and toxic		Red and Yellow (IS Standard Colour

Explanation.-Cylinders intended for gas mixtures can be marked with the words "Gas Mixture" or "Mixed Gas". In addition, the cylinders shall be marked with the names (symbols if necessary) of the components use of the particulars gas mixture, or by painting, if the cylinders are intended for the casual use of the particular gas mixture.

- (3) No person shall in any way interfere with or change the colour painted on a gas cylinder: Provided that nothing in this sub-rule shall be deemed to prohibit the re-painting of a cylinder with the identification colour painted on it when it is required for the maintenance of the cylinder or when a cylinder is converted from one gas service to another gas service in accordance with these rules.

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- (i) Do not change the colour of this cylinder.
(ii) This cylinder should not be filled with any gas other than the one it now contains.
(iii) No flammable material should be stored in the immediate vicinity of this cylinder or in the same room in which it is kept.
(iv) No oil or similar lubricant should be used on the valves or other fittings of this cylinder.
(v) Please look for the next date of test, which is marked on a metal ring inserted between the valve and the neck of the cylinder, and if this date is over, do not accept the cylinder.

10. Restriction on delivery or despatch of cylinders.-

- (1) No person shall deliver or despatch any cylinder filled with any compressed gas to any other person in India who is not the holder of a licence to possess such compressed gas cylinders or his authorised agent unless he is exempted under these rules to possess such compressed gas cylinders without a licence.
(2) gas cylinders delivered or despatched by a person under sub-rule (1) shall be of the type for which he is licensed and shall not exceed the quantity which the person to whom it is delivered or despatched is authorised to possess under these rules.
(3) Nothing in sub-rule (1) and (2) shall apply to the delivery or despatch of gas cylinders to the defence forces of the Union, port authorities or Railway administration.

11. Repairing of seamless gas cylinders during use.- No person shall repair or cause to repair any leakage in the body of a seamless gas cylinder.

12. Repairing of welded/brazed cylinders.-

- (1) Welded or brazed cylinder showing leaks at any place other than the welded or brazed seams shall not be repaired and shall be rendered unserviceable.
(2) In the case of cylinders having welded/brazed seams, repairing of minor defects, such as small weld cracks, pin holes, blow holes, undercuts in welding, leaks at the weld (shown in periodical hydrostatic test) may be allowed provided--
(i) the defects have been removed by grinding, chipping, gouging or other approved methods;
(ii) the repairing is carried out by a certified welder at the premises of a manufacturer of cylinders recognised by the Chief Controller under the supervision of a competent person by--
(a)welding if the original seams were welded;
(b)brazing, if the original seams were brazed;
(iii) the cylinder is properly head-treated after the repairs;
(iv) the welded or brazed seams of the cylinder are radiographed if the cylinder was originally required to be radiographed after its manufacture;
(v) after repairs and heat-treatment, the cylinder is subjected to the same pneumatic and hydrostatic test or hydrostatic stretch test as was done at the time of manufacture.
(3) Welded or brazed cylinder, before repairing, shall be throughly cleaned and gas-freed or

otherwise prepared for safely carrying out hot work and certified in writing, by a competent person, to have been so prepared. The certificate shall be preserved for a period of three months and produced to the Chief Controller on demand.

- (4) No person shall refill any cylinder which has been repaired under sub-rule (2) with any gas unless a full report on the repairs and test carried out on the cylinder, accompanied by the repairer's certificate of testing are furnished to the Chief Controller and his permission is obtained for its refilling.
- (5) Notwithstanding anything contained in sub-rule (2), no repairs shall be carried out to any dissolved acetylene gas cylinder showing leaks in its weld seam.

13. Prohibition of employment of children and intoxicated persons.-No child under the age of eighteen years and no person who is in a state of intoxication shall be employed in loading or unloading or transport of any compressed gas cylinder or in any premises licensed under these rules.

14. Prohibition of smoking, fires, lights and dangerous substances.-

- (1) No person shall smoke and no fires, other than blow pipe flames for repairs, or no articles or substances of flammable nature or liable allowed at any time in proximity to a place where any cylinder for flammable gases is being filled, stored or handled.
- (2) No person in or near any place where cylinders containing flammable gases are filled, stored or handled shall have in his possession any matches, fuses or other appliances for producing ignition or explosion.

15. General precautions.-

- (1) Cylinders together with their valves and other fittings and the fittings and the identification colours under these rules shall always be maintained in good condition.
- (2) No oil or similar lubricant shall be used on any valves or other fittings of any cylinder.
- (3) Save as provided in Rules 12 and 41, no cylinder shall be subjected to any heat treatment or exposed to a high temperature or to the Sun or stored with any other flammable or explosive material.
- (4) Every cylinder containing compressed gas shall have its valve securely closed to as to prevent leakage. Valves fitted to the cylinders containing Liquefied Petroleum Gas and highly toxic gases like Boron Trifluoride, Carbon Monoxide, Fluorine, Hydrogen Chloride, Cynogen Chloride, Chlorine Trifluoride, Hydrogen Cynide, Hydrogen Fluoride, Hydrogen Sulphide, Methyl Bromide, Nitrogen Tetroxide, Chlorine Ammonia or Sulphur Dioxide shall be provided with security nut on the outlet to act as a secondary means of safeguard against leakage of gas.
- (5) If a leak in the valve cannot be rectified by tightening the gland nut or the spindle, the cylinder shall be removed to an open space where it is least dangerous to life and property and the filler shall be informed.

16. Special precautions against accidents.-

- (1) No person shall commit or attempt to commit any act which may tend to cause a fire or explosion in or about any place where gas under pressure in a cylinder is stored, handled or transported.
- (2) Every person storing compressed gas cylinders and every person in charge of or engaged in the storage handling and transport of such gas cylinders, shall at all times-
 - (a) comply with the provisions of these rules and the conditions of any licence relating thereto;
 - (b) observe all precautions for the prevention of accident by fire or explosion;
 - (c) prevent any person from committing any act referred to in sub-rule (1).

17. Competent person to be incharge of operations.-Every person holding or acting under a licence granted under these rules, shall , whenever cylinders are filled, loaded, unloaded, examined or tested, depute a competent and experienced person to be present and to conduct any of the said operations in accordance with provisions of these rules.

18. Handling and use.-

- (1)

- Cylinders shall be adequately supported during handling.
- (2) Trolleys and cradles of adequate strength shall, as far as possible, be used when moving the cylinders.
 - (3) The cylinders shall be handled carefully and not be allowed to fall upon one another or otherwise subjected to any undue shock.
 - (4) Sliding, dropping or playing with cylinders is prohibited.
 - (5) Liquefied petroleum gas cylinders and cylinders containing liquefiable gases shall always be kept in an upright position and shall be so placed that they cannot be knocked over.
 - (6) Cylinders used in horizontal position shall be so secured that they cannot roll.
 - (7) Open flames, lights, lighting of fires, welding and smoking shall be prohibited in close proximity to any cylinder containing flammable gases except those while in use for welding, cutting or heating.
 - (8) Working places shall not be classified as storage places for the purpose of licensing.

19. Restrictions on filling.-

- (1) Welded cylinders shall not be used for filling any permanent or high pressure liquefiable gas or highly toxic gases like Boron Trichloride, Carbonyl Chloride (Phosgene), Chlorine Trifluoride, Cyanogen, Cyanogen Chloride, Hydrogen Cyanide, Hydrogen Sulphide.
- (2) No cylinder which has once been used for storage and transportation of coal gas shall be used for filling with any other gas.
- (3) No cylinder shall be filled with any gas that is capable of combining chemically so as to endanger its serviceability.

20. Storage of cylinders.-

- (1) Cylinders shall be stored in a cool, dry, well ventilated place under cover, away from boilers, open flames, steam pipes or any potential sources of heat and such place of storage shall be easily accessible.
- (2) The storage room or shed shall be of fire resistant construction.
- (3) Thin wall cylinders such as liquefied petroleum gas cylinders and dissolved gas cylinders shall not be stacked in a horizontal position.
- (4) Cylinders containing flammable gases and toxic gases shall be kept separated from each other and from cylinders containing other types of gases by an adequate distance or by a suitable partition wall.
- (5) Cylinders shall not be stored under conditions which will cause them to corrode.
- (6) Cylinders shall not be stored along with any combustible material.
- (7) Empty cylinders shall be segregated from the filled ones and care shall be taken that all the valves are tightly shut.

21. Electrical installations.-In premises for filling and storing flammable gases in cylinders all electric meters, distribution boards, switches, fuses, plugs and sockets, electric fixed lamps, portable hand lamps and motors, shall be of flame proof construction conforming to appropriate Indian Standard Specifications or such other specification as are approved by the Chief Controller and shall be effective earthed.

22. Purity of gas.-

- (1) Compressed gases shall be free from impurities which are likely corrode the metal of the cylinder or form an explosive substance with it or cause the gases to decompose or explode.
- (2) The gases shall be as dry as is possible and in no instance shall the aqueous phase separate when a liquefied gas is cooled to 00 C.
- (3) Before filling any cylinder with gases like carbon monoxide, coal gas, hydrogen or methane, the gas shall be free from hydrogen sulphide and other sulphurous impurities as far as practicable. The moisture shall be less than 0.00 g/m⁰² of gas at normal temperature and pressure.

23. Cylinder subjected to the action of fire.-

- (1) A cylinder exposed to fire shall not be used unless it has undergone proper examination and Hydrostatic/hydrostatic stretch test. If deleterious structural changes in the material due to the action of heat of the fire is apprehended to have taken place, the cylinder shall have to be subjected to proper heat treatment, followed by hydrostatic test or hydrostatic stretch test, as the case may be, before the cylinder is taken into use.
- (2) Dissolved acetylene cylinders which have been damaged by fire shall be condemned and destroyed by an experienced and competent person.

24. Ownership of cylinder.-A cylinder filled with a compressed gas shall not be transported unless it was charged by or with the consent of the owner of the cylinder.

25. Re-testing of cylinder.-A cylinder for which prescribed periodical re-test has become due shall not be charged and transported until such re-rest has been properly made.

26. Owner's record.-The owner of a cylinder shall keep for the life of each cylinder, a record containing the following information regarding each cylinder, namely:--

- (I) Cylinder manufacturer's name and the rotation number;
- (II) The specification number to which the cylinder is manufactured;
- (III) Dte of original hydrostatic test/hydrostatic stretchy test;
- (IV) Cylinder manufacturer's test and inspection certificates.
- (V) Number and date of letter of approval granted by the Chief Controller.

27. Conversion of cylinders.-Gas cylinders designed and approved for filling with a particular gas shall not be used for filling with any other gas unless specific approval is obtained from the Chief Controller.