

STATUTORY RULES AND ORDERS,  
1923, No. 983.

CINEMATOGRAPH, ENGLAND.

REGULATIONS, DATED JULY 30, 1923, MADE BY THE SECRETARY OF STATE UNDER THE CINEMATOGRAPH ACT, 1909 (9 EDW. 7. c. 30).

In pursuance of the Cinematograph Act, 1909, I hereby make the following Regulations :—

PART I.

GENERAL.

DEFINITIONS.

1. In these Regulations—

- (a) The word "*building*" shall be deemed to include any booth, tent or similar structure.
- (b) The expression "*new building*" means a building newly erected or adapted after the date on which these regulations come into force for the purpose of cinematograph exhibitions.
- (c) The expression "*cinematograph exhibition*" includes any exhibition to which the Act applies.

SEATING AND EXITS.

2.—(a) No building shall be used for cinematograph exhibitions unless it be provided with an adequate number of exits clearly indicated and so placed and maintained as readily to afford the audience ample means of safe egress.

(b) The doors of all exits shall be so constructed and maintained as easily to open outwards on being pressed from within.

(c) The seating in the building shall be so arranged as not to interfere with free access to the exits.

(d) The gangways, the staircases, and the passages leading to the exits, shall, during the presence of the public in the building, be kept clear of obstructions. No person shall be allowed to stand or sit in any of the gangways intersecting the rows of seats, or in the space between the front row of seats and the screen; and if standing be permitted by the licensing authority in any other gangway or portion of the auditorium, sufficient room shall be left to allow persons to pass easily to and fro.

STAFF.

3.—(a) The licensee or some responsible person nominated by him in writing for the purpose shall be in charge during the whole

time of any exhibition and there shall also be during that time a sufficient staff of attendants in the building for the purpose of securing safety.

(b) All persons responsible for or employed in or in connection with the exhibition shall take all due precautions for the prevention of accidents, and shall abstain from any act whatever which tends to cause fire and is not reasonably necessary for the purpose of the exhibition.

#### FIRE APPLIANCES.

4.—(a) Fire appliances suitable to the character of the building and adequate to deal with an outbreak of fire shall be provided and maintained in good working order. During the exhibition such appliances shall be in the charge of some person<sup>(a)</sup> specially nominated for that purpose who shall see that they are kept constantly available for use.

(b) There shall always be within the enclosure sufficient means of dealing with fire readily available for use, and these shall include the following, namely, a thick woollen blanket, two buckets of water, and a bucket of dry sand. Before the commencement of each exhibition the operator shall satisfy himself that the fire appliances within the enclosure are ready for use.

#### SMOKING.

5. No smoking shall at any time be permitted within the barrier or enclosure, nor in the film room nor in any part of the premises in which films are stored, wound, or repaired. Notices stating that smoking is prohibited shall be kept posted in the enclosure and film room and any such part of the premises as aforesaid.

#### INFLAMMABLE ARTICLES.

6. No inflammable article shall unnecessarily be taken into, or allowed to remain in, the enclosure, the film room, or any part of the premises in which films are stored, wound, or repaired.

#### ENCLOSURES.

##### *Regulations applying to all classes of buildings.*

7.—(1) (a) The projecting apparatus shall be placed in an enclosure of substantial construction made of or lined internally with fire-resisting material and of sufficient dimensions to allow the operator to work freely.

(b) All fittings and fixtures within the enclosure other than the frames of outside windows shall be constructed of or covered with fire-resisting material.

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(a) It is not required that the person specially nominated should *necessarily* be employed exclusively in taking charge of the fire appliances, but he must not be given other work during an exhibition which would take him away from the building or otherwise prevent him from being immediately available in case of danger or alarm of fire.

The entrance to the enclosure shall be suitably placed and fitted with a self-closing close-fitting door which shall be kept closed during the exhibition.

For the purpose of this Regulation the expression "fire-resisting material" includes teak or oak not less than two inches thick.

(c) The openings through which the necessary pipes and cables pass into the enclosure shall be efficiently sealed or bushed, as the case may be.

(d) The openings in the front face of the enclosure shall be covered with glass and shall not be larger than is necessary for effective projection and observation.

Each such opening shall be fitted with a screen of fire-resisting material, which can be released from both the inside and the outside of the enclosure so that it automatically closes with a close-fitting joint. The screens shall be so constructed and arranged that they can all be released simultaneously from the operating position near any of the projectors.

The openings shall not exceed two for each projecting apparatus; and not more than two of the openings shall be left un-screened at any one time notwithstanding that there be two or more lanterns in the enclosure unless a control is provided by which all the screens can be released simultaneously from both the inside and the outside of the enclosure.

(e) The door of the enclosure and all openings, bushes, and joints shall be so constructed and maintained as to prevent, so far as possible, the escape of any smoke into the auditorium or any part of the building to which the public are admitted.

(f) Adequate means of ventilation shall be provided with sufficient inlets and outlets so as to ensure a constant supply of fresh air. The inlets and outlets shall communicate directly with the outside of the building, and shall be so arranged as not to expose the operator to a direct draught.

(g) If the enclosure is inside the auditorium, either a suitable barrier shall be placed round the enclosure at a distance of not less than two feet from it, or other effectual means shall be taken to prevent the public from coming into contact with the enclosure.

Provided that this requirement shall not apply where the enclosure is of permanent construction and is not entered from the auditorium.

(h) The enclosure shall be in charge of a competent operator over eighteen years of age, who shall be present in the enclosure during the whole time that the apparatus is in use. This shall not prevent the operator leaving the enclosure for a short period in case of need provided that a competent assistant, over sixteen years of age, is left in charge and the operator remains within immediate call.

(i) No unauthorised person shall go into the enclosure or be allowed to be within the barrier.

*Regulations applying only to specified classes of buildings.*

(2) In the case of buildings used habitually for cinematograph exhibitions the enclosure shall be outside the auditorium; and in the case of permanent buildings used habitually as aforesaid the enclosure shall also be permanent.

Provided that if the licensing authority is of opinion that, in the case of an existing building, compliance with either or both of the requirements in the preceding paragraph is impracticable or in the circumstances unnecessary for securing safety, the requirement or requirements shall not apply.

In any new building where the enclosure is permanent, the enclosure shall also comply with the following requirements:—

- (a) a window or skylight shall be provided.
- (b) the entrance shall be from the open air.
- (c) alternative means of egress shall be provided unless the licensing authority is satisfied that compliance with this requirement is impracticable.

PROJECTING APPARATUS AND FILMS.

**8.—(a)** The projecting apparatus shall be placed on firm supports constructed of fire-resisting material.

(b) Every lantern shall be fitted with a metal shutter which can readily be inserted by hand between the source of light and the film gate, and every projector shall be fitted with a metal shutter so arranged as automatically to cut off the film-gate from the source of light when the projector stops.

(c) The construction of the film gate shall be substantial and such as to afford ample heat-radiating surface. The passage for the film shall be sufficiently narrow to prevent flames travelling upwards or downwards from the light-opening.

**9.—(a)** Projectors shall be fitted with two metal boxes of substantial construction to and from which the film shall be made to travel, unless both the film spools are contained in a metal chamber of substantial construction *below* the projector. There shall not be more than 2,000 feet of film in either of the two metal boxes.

(b) The film boxes or chamber shall be made to close in such a manner, and shall be fitted with film slots so constructed, as to prevent the passage of flame to the interior of the box or chamber, and they shall remain so closed during the whole time that projection is taking place.

**10.** Take-up spools shall be mechanically driven and films shall be wound upon spools so that the wound film shall not at any time reach or project beyond the edges of the flanges of the spool.

**11.—(a)** During the exhibition all films when not in use shall be kept in closed metal boxes of substantial construction. When in the enclosure not more than six spools shall be kept in one box at the same time.

(b) Not more than 12 spools or 20,000 feet of film altogether shall be kept in the enclosure and the rewinding room at the same time.

#### REWINDING ROOM.

**12.**—(a) A separate room shall be provided for the rewinding and repairing of films, which shall be constructed throughout of, or lined internally with, fire-resisting material.

(b) All fittings and fixtures within the rewinding room shall be constructed of, or covered with, fire-resisting material, and the entrance shall be provided with a self-closing close-fitting door of fire-resisting material which shall not communicate directly with the auditorium or any part of the building to which the public are admitted. If there is any communicating doorway or other opening between the enclosure and the rewinding room it shall also be provided with a door or shutter of fire-resisting material.

For the purposes of this Regulation the expression "fire-resisting material" includes teak or oak not less than 2 inches thick.

(c) The rewinding room shall be provided with adequate means of ventilation, with sufficient inlets and outlets so as to ensure a constant supply of fresh air. The inlets and outlets shall communicate directly with the outside of the building.

(d) Alternative means of egress shall be provided other than through the enclosure.

Provided that if the licensing authority is of opinion that compliance with any of the requirements of this regulation is impracticable or, in the case of any of the requirements in paragraphs (a), (b) and (d), that it is in the circumstances unnecessary for securing safety, the requirement or requirements shall not apply.

#### LIGHTING AND ELECTRICAL INSTALLATION.

**13.**—(a) Where the general lighting of the premises can be controlled from within the enclosure, there shall also be separate and independent means of control outside of and away from the enclosure.

(b) The auditorium and exits therefrom to the outside of the building and all parts of the building to which the public are admitted shall throughout be adequately illuminated (a) during the whole time the public is present. The lighting for this purpose (hereinafter referred to as safety lighting) shall be supplied from a separate source from that of the general lighting of the premises and shall not be controllable from the enclosure. (b) Where oil lamps are provided colza oil shall be used.

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(a) By adequate illumination it is meant that there should be such a degree of light as to enable the spectators to see their way out.

(b) *e.g.*, if the general lighting is by electricity, the safety lighting shall be by (a) electricity from another source, (b) gas, or (c) oil or candles.

**14.** Where electrical energy is used for lighting or other purposes within the building the following requirements shall be observed :—

- (a) Except as otherwise provided in these Regulations, the installation generally shall be in accordance with the Wiring Rules of the Institution of Electrical Engineers.
- (b) The main supply fuses and switches shall not be accessible to the public. They shall be located where there is ample space and head room and where there is no risk of fire resulting therefrom.
- (c) A separate circuit shall be taken from the source of supply for the projector circuit so that no accident to this circuit can affect the general lighting.
- (d) Each of the main circuits shall be separately protected by an efficient linked switch and by a fuse on each pole.
- (e) The general wiring of the building shall be protected by metal conduit mechanically and electrically continuous or by hard wood casings, except as regards any necessary flexible conductors such as may be required for pendant lamps or movable fittings.
- (f) All fuses and distribution boards shall be of a completely protected type so constructed that the fuse holders can be handled for renewal of the fuse wires without risk of touching live metal.
- (g) Portable lamps for the orchestra or similar lighting shall be connected to a separate circuit or circuits from the distribution fuse boards.
- (h) The electrical installation shall be in charge of a competent person whether the operator or another, who shall have received an adequate electrical training for his duties.
- (i) The competent person shall satisfy himself before the commencement of each performance that the electrical apparatus, including the projector circuits, is in proper working order.

Provided that paragraphs (a), (e), (f), (g) of this Regulation shall not apply to such parts of the electrical installation as were in use before the date of these Regulations, except in the event of such parts being altered or renewed.

**15.** No illuminant other than electric light, limelight, or acetylene shall be used within the lantern and the following conditions shall be observed :—

(1) *Electric Light.*—(a) All cables and wires for the projector circuits within and without the enclosure shall be heavily insulated and any necessary slack cable within the enclosure shall be heavily covered with asbestos.

For permanent enclosures installed after the date of these Regulations, the cables and wires except as regards any necessary

slack cable shall, unless armoured, be further protected by heavy gauge screwed metal conduit efficiently earthed. The conduit and fittings shall be bushed where necessary to prevent abrasion of the insulating material.

For temporary enclosures the cables and wires shall be secured by insulating cleats. Within the enclosure they shall be heavily protected by asbestos and without the enclosure they shall be protected by casings in all positions where they are liable to damage.

(b) An efficient double-pole main switch shall be fixed within the enclosure whereby all pressure may be cut off from the projector circuit or circuits within the enclosure, and where the lantern is earthed an additional double-pole switch shall be fixed for each arc lamp so that the pressure may be cut off whilst re-carboning is taking place.

(c) Where two or more projectors are installed and a change-over switch is required, it shall, unless it be a double-pole switch having a secure "off" position, be in addition to and not in substitution for the above main switch.

(d) All live parts of apparatus within five feet of the projector shall be shielded so that they cannot be accidentally touched. The covers of enclosed switches shall be of metal and, with the exception of change-over switches, shall be so constructed that the switch handle does not work through an open slot. Where live metal is exposed so that it may be touched, the floor within a radius of three feet from a point immediately below the live metal shall be covered with insulating material.

(e) Within the enclosure the pressure of the supply between any two conductors or between any conductor and earth shall not at any time exceed 250 volts direct or 125 volts alternating for the projector circuit.

Where the supply of alternating current is at a higher pressure, the pressure shall be reduced by means of a double-wound transformer.

In the case of a stand-by or temporary supply from across the outer conductors of a direct-current 3-wire system exceeding 250 volts, the projector circuit shall be taken as a shunt across part of a resistance connected across the outer conductors of the supply, so that the pressure within the enclosure shall not at any time exceed 250 volts.

(f) The projector motor circuit shall be controlled by a double-pole switch or hand-shield plug. The motor starter and its resistance may be within the enclosure, but these and all other parts of the circuit shall be protected so that no live metal can be inadvertently touched.

(g) Fuses shall be protected by enclosure in covers or cabinets against scattering of hot metal and shall be mounted in carriers or holders, so constructed that the hand cannot inadvertently touch live metal and that the hand is protected from the flash should a fuse blow on the insertion of the carrier in the contacts.

(h) The lamp or lamps for lighting the enclosure and the re-winding room shall not be connected to the safety lighting.

(i) All metal work liable to become accidentally charged, including the projecting apparatus, shall be efficiently earthed. The size of the earth wires shall be in accordance with the requirements of the Wiring Rules of the Institution of Electrical Engineers.

(j) The arc lamp adjusting handles shall be made of insulating material and shall be so constructed and arranged that the hand cannot inadvertently touch live metal.

(k) An ammeter shall be provided in the projector circuit within the enclosure.

(l) Resistances shall be so constructed and maintained that no coil or other part shall at any time become unduly heated. (a)

The framework, supports and enclosures of resistances shall be made entirely of fire-resisting material.

Resistances shall not be attached to wood work and shall, as far as possible, be kept away from any wood work. All wood work shall, where necessary, be effectively protected against overheating.

The terminals of the resistances and the connecting cables shall not be placed above the resistance elements.

Resistances placed where they are liable to be accidentally touched shall be efficiently guarded.

(m) Resistances, in which more than two kilowatts are dissipated, shall be placed outside the enclosure and in a room or place other than the rewinding room accessible only to the technical staff. Adequate precautions shall be taken against fire resulting therefrom. If within the building, the room or place shall not communicate directly with the auditorium. It shall be well ventilated by ample inlets and outlets connecting directly with the outside air.

Switches suitably placed shall be provided by means of which the pressure may be cut off from the resistances.

(n) The motor generators or the electrical generating plant, as the case may be, and the main switchgear shall be in a fire-resisting room or rooms which may also contain the main resistances and the main supply fuses and switches. This room shall be well ventilated and shall not communicate directly with the auditorium or any part of the building to which the public are admitted.

Provided that the requirements in paragraphs (c), (d), (m), (n) shall not apply to apparatus in use before the date of these Regulations and the requirements in paragraphs (e), (g), (i), (j), (k) shall not apply, as regards such apparatus, until two years from the said date, except in the event of the apparatus being renewed or materially altered.

(2) *Limelight*.—The tubing shall be of sufficient strength to resist pressure from without and shall be properly connected up.

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(a) *e.g.*, they should not become so heated that a piece of newspaper placed in contact with any part of the resistance would readily ignite.



Cylinders containing gas under pressure other than acetylene gas shall be constructed, tested and filled in conformity with the recommendations either of the Committee on the manufacture of compressed Gas Cylinders appointed by the Home Office in 1895 or of the Committee on Compressed Gas Cylinders appointed by the Department of Scientific and Industrial Research in 1918. (a)

(3) *Acetylene*.—Acetylene, whether or not in conjunction with oxygen, shall be used only when supplied :—

- (a) direct from cylinders or other vessels containing a homogeneous porous substance with or without acetone, which, in regard to their contents and the degree of compression, comply with the requirements of the Secretary of State's order (b) regulating the compression of acetylene gas into cylinders containing a porous substance, and in force for the time being; or
- (b) from a generator which shall be situated outside the building in a place approved by the licensing authority, the gas being supplied to the operator's box, so far as practicable, by pipes of metal other than unalloyed copper, and such flexible tubing as is necessarily employed being of sufficient strength to resist pressure from without and being properly connected up.

Provided that acetylene supplied direct from a generator shall not be employed as an illuminant in wooden buildings or in tents, or other movable or temporary structures.

#### EXHIBITION OF REGULATIONS.

16. The licensee shall see that a copy of these Regulations is exhibited in the enclosure and is easily accessible to the operators.

#### BUILDINGS OCCASIONALLY USED.

17. Where a building is used only occasionally for the purposes of a cinematograph exhibition, the provisions of the following Regulations shall not apply unless specially imposed and notified as conditions by the licensing authority in pursuance of Section 7 of the Act in cases of exceptional danger, viz. :—

Regulations 2(b), 11(b), and 14 (excepting paragraphs (c) (h) and (i) in so far as they relate to the projector circuits) but the following requirements shall be complied with, viz. :—

- (a) The doors of all exits shall be arranged to meet any requirements of the licensing authority.
- (b) The film boxes fitted to the projector shall not exceed 14 inches in diameter, inside measurement.
- (c) Not more than 3 spools altogether shall be kept in the enclosure at any one time

(a) These recommendations are printed in the appendix to these Regulations.

(b) The Order at present in force is that dated the 23rd June, 1919 (Statutory Rules and Orders, 1919, No. 809).

## PART II.

## PORTABLE PROJECTORS.

18. Where a portable self-contained projector is used, regulations 2(b), 4(a), 5 to 12 inclusive and 14 to 17 (except 17(a)) inclusive shall not apply provided that regulations 1, 2(a), (c), (d), 3, 4(b) (with the substitution of the words "reserved space" for the word "enclosure"), 13 (with the substitution of the words "reserved space" for the word "enclosure"), 17(a) whether or not the building is only occasionally used) and 19 to 26 inclusive are complied with.

## RESERVED SPACE.

19.—(a) If the projector is erected in any part of the auditorium or any place to which the public have access, effectual means shall be taken, whether by the erection of a suitable barrier or otherwise, to maintain round the projector a clear space of at least 3 feet, hereinafter referred to as "the reserved space."

(b) No unauthorised person shall be allowed within the reserved space.

(c) No smoking shall at any time be permitted within the reserved space.

(d) No inflammable article shall unnecessarily be taken into or allowed to remain in the reserved space.

## PROJECTORS AND FILMS.

20. The projector shall be placed on a firm support and shall be kept clear of the access to any exit.

21.—(a) The projector and the illuminant shall be entirely enclosed in a casing of fire-resisting material except for such openings as are necessary for effective manipulation and ventilation.

(b) Any electric wiring or terminals fitted within the casing shall be so placed that it shall be impossible for films in use in the projector to come in contact with them.

(c) Each electric circuit on the projector shall be fitted with a separate switch controlled from outside the casing, and so placed as to be within reach of the operator when standing at the projector.

(d) No illuminant other than electric light in hermetically sealed lamps shall be used within the projector, and the illuminant shall be separately encased in such a way as to prevent contact with the film.

(e) The heat of the illuminant, and its position in relation to the optical system, shall be such that it is impossible for the rays of light to ignite a stationary film.(a)

22.—(a) The projector shall be fitted with film-boxes of fire-resisting material, which shall be made to close in such a manner,

(a) This requirement will be considered as met if a film stationary in the film-gate fails to ignite within a period of three minutes.

and (where ribbon film is employed) shall be fitted with film-slots so constructed, as to prevent the passage of flame to the interior of the box.

(b) The film boxes shall not be capable of carrying films of more than 10 inches in diameter, and shall be so constructed as to be easily detachable from the apparatus.

(c) All films shall be contained in film-boxes, which shall be attached to or removed from the projector without being opened, so that at no time shall a film be exposed except the portion necessary for threading up.

(d) During an exhibition not more than three film-boxes (including the two actually attached to the projector) shall be in the auditorium at any one time. If further film-boxes are required, they shall be kept in closed metal boxes outside the auditorium, and, if in the building, in a place approved by the licensing authority.

#### ELECTRIC CIRCUITS FOR THE PROJECTOR.

**23.**—(a) All electric conductors shall be of adequate size for the current they have to carry and shall be efficiently covered with insulating material and shall be either (i) placed out of reach of persons in the auditorium and where they are not liable to damage, or (ii) protected against injury by suitable casings.

(b) Resistances shall be made entirely of fire-resisting material, and shall be so constructed and maintained that no coil or other part at any time shall become unduly heated. (a) If inside the auditorium, they shall be adequately protected by a wire guard or other efficient means of preventing accidental contact, and shall not be placed within reach of persons in the audience.

(c) The operator shall satisfy himself before the commencement of each performance that all cables, leads, connections, resistances, and fuses are in proper working order. The resistances, if not under constant observation, shall be inspected at least once during each performance. If any fault is detected, current shall be immediately switched off, and shall remain switched off until the fault has been remedied.

(d) The projector circuit shall be independently protected by a double-pole switch and fuses properly enclosed and placed near the source of supply or the point of connection with the general lighting supply, as the case may be. Provided that, where the current does not exceed five amperes and the connection of the projector circuit to the general lighting supply is made by means of a connector as described in paragraph (e) below, such a connector may be used in substitution for a double pole switch.

(e) Where the projector circuit is connected to the general lighting supply, it shall be connected only at a point where the wires of the general lighting supply are of ample size for the current they may have to carry, and the connection shall be either

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(a) *e.g.*, they should not become so heated that a piece of newspaper placed in contact with any part of the resistance would readily ignite.

by (a) securely made joints or connections, or (b) a properly constructed wall type connector of hand shield type. It shall not be connected to any lighting fitting, or by means of an " adaptor " to a lampholder.

#### EXHIBITION OF REGULATIONS.

**24.** A copy of so much of these Regulations as applies when a portable projector is used shall be exhibited in any room or place in which a portable projector is used for the purposes of an exhibition.

#### PART III.

#### LICENCES.

**25.** Subject to the provisions of No. 26 of these Regulations, every licence granted under the Act shall contain a clause providing for its suspension by the licensing authority in the event of any failure on the part of the licensee to carry out these Regulations, or of the building becoming otherwise unsafe, or of any material alteration being made in the building or enclosure without the consent of the licensing authority.

**26.** Where a licence has been granted under the Act in respect of a movable building, a plan and description of the building, certified with the approval of the licensing authority, shall be attached to the licence. Such a licence may provide that any of the conditions or restrictions contained therein may be modified either by the licensing authority, or by the licensing authority for the district where an exhibition is about to be given. The licence and plan and description or any of them shall be produced on demand to any police constable or to any person authorised by the licensing authority, or by the authority in whose district the building is being, or is about to be, used for the purpose of an exhibition.

#### PART IV

#### REPEAL.

**27.** The Regulations dated February 18th, 1910, (a) and May 20th, 1913, (b) made under the Cinematograph Act, 1909, are hereby repealed, provided, nevertheless, that any licence granted prior to such repeal shall remain valid for the period for which it was granted without the imposition of any more stringent condition than may have been imposed at the time of the grant.

*W. C. Bridgeman,*

One of His Majesty's Principal  
Secretaries of State.

Whitehall,  
30th July, 1923.

(a) S.R. & O. 1910, No. 189.

(b) S.R. & O. 1913, No. 566.

## . APPENDIX.

## I.—SUMMARY OF THE RECOMMENDATIONS OF THE DEPARTMENTAL COMMITTEE OF THE HOME OFFICE ON THE MANUFACTURE OF COMPRESSED GAS CYLINDERS. [C 7952 of 1896.]

*Cylinders of Compressed Gas (Oxygen, Hydrogen, or Coal Gas).*

(a) *Lap-welded wrought iron.*—Greatest working pressure, 120 atmospheres, or 1,800 lbs. per square inch.

Stress due to working pressure not to exceed  $6\frac{1}{2}$  tons per square inch.

Proof pressure in hydraulic test, after annealing, 224 atmospheres, or 3,360 lbs. per square inch.

Permanent stretch in hydraulic test not to exceed 10 per cent. of the elastic stretch.

One cylinder in 50 to be subjected to a statical bending test, and to stand crushing nearly flat between two rounded knife-edges without cracking.

(b) *Lap-welded or seamless steel.*—Greatest working pressure, 120 atmospheres, or 1,800 lbs. per square inch.

Stress due to working pressure not to exceed  $7\frac{1}{2}$  tons per square inch in lap-welded, or 8 tons per square inch in seamless cylinders.

Carbon in steel not to exceed 0.25 per cent. or iron to be less than 99 per cent.

Tenacity of steel not to be less than 26 or more than 33 tons per square inch. Ultimate elongation not less than 1.2 inches in 8 inches. Test-bar to be cut from finished annealed cylinder.

Proof pressure in hydraulic test, after annealing, 224 atmospheres, or 3,360 lbs. per square inch.

Permanent stretch shown by water jacket not to exceed 10 per cent. of elastic stretch.

One cylinder in 50 to be subjected to a statical bending test, and to stand crushing nearly flat between rounded knife-edges without cracking.

*Regulations applicable to all Cylinders.*

Cylinders to be marked with a rotation number, a manufacturer's or owner's mark, an annealing mark with date, a test mark with date. The marks to be permanent and easily visible.

Testing to be repeated at least every two years and annealing at least every four years.

A record to be kept of all tests.

Cylinders which fail in testing to be destroyed or rendered useless.

Hydrogen and coal gas cylinders to have left-handed threads for attaching connections and to be painted red.

The compressing apparatus to have two pressure gauges, and an automatic arrangement for preventing overcharging. The compressing apparatus for oxygen to be wholly distinct and unconnected with the compressing apparatus for hydrogen and coal gas.

Cylinders not to be refilled till they have been emptied.

If cylinders are sent out unpacked the valve fittings should be protected by a steel cap.

A minimum weight to be fixed for each size of cylinder in accordance with its required thickness. Cylinders of less weight to be rejected.

II.—EXTRACT FROM FIRST REPORT(a) OF THE GAS CYLINDERS  
RESEARCH COMMITTEE.

*Summary of the recommendations for ordinary commercial Cylinders for storage and transport of the so-called "Permanent" Gases.*

(i) The cylinders should be solid drawn.

(ii) The material should have the following chemical composition:—

Carbon	...	...	...	...	Between 0.43 per cent. and 0.48 per cent.
Sulphur	...	...	...	...	Not to exceed 0.045 per cent.
Phosphorus	...	...	...	...	Not to exceed 0.045 per cent.
Manganese	...	...	...	...	Between 0.5 per cent. and 0.9 per cent.
Silicon	...	...	...	...	Not to exceed 0.3 per cent.

(iii) The general conditions for the supply of the material should be as given in paragraph 26.

(iv) Cylinders after manufacture should be raised to a temperature not less than 820°C. and not exceeding 850°C. in a furnace, remaining within the furnace only for sufficient time to ensure that all parts of the cylinder are at the same temperature. Before the temperature falls appreciably they should be removed, and allowed to cool in still air in such a position that they are not subjected to draughts.

(v) Mechanical tests should be made on the material of one finished cylinder in every batch, or, in cases in which the number in any batch exceeds one hundred, on one finished cylinder in every 100.

(vi) The results of the tensile test should conform to the following conditions:—

The yield stress should not be less than 20 tons per sq. in.

The maximum stress should not be less than 40 tons per sq. in.

The elongation on the 6 ins. gauge length of the specimen shown in Fig. 1 should be not less than 14 per cent.

(vii) Impact tests should be made on the material of cylinders which are not less than 6 ins. in diameter. The mean energy required for the fracture of three test-pieces as specified in para. 32 should not be less than 3 ft. pounds for the transverse tests and 5 ft. pounds for the longitudinal tests.

(viii) Before the necking operations, each cylinder should be examined for maximum and minimum thickness, and for external and internal surface defects.

(ix) The maximum working pressure should be 120 atmospheres or 1,800 lbs. per sq. in. until there is general agreement amongst gas compressors that a higher limit is desirable.

(x) The stress due to working pressure should not exceed 10 tons per sq. in.

(xi) One finished cylinder in every batch, the minimum number being one in every 100, should be subjected to, and prove satisfactory under, the flattening test specified in para. 37.

(xii) The<sup>e</sup> proof pressure in the hydraulic test, after heat treatment, should not exceed 200 atmospheres or 3,000 lbs. per sq. in.

(xiii) The permanent stretch shown by the water jacket test should not exceed 10 per cent. of the elastic stretch.

(xiv) In cases where cylinders are closed at the end by welding, a further hydraulic test not exceeding 190 atmospheres or 2,850 lbs. per sq. in. should be imposed in order to prove that the cylinders are watertight.

(a) The Report of the Committee is obtainable from H.M. Stationery Office, Adastral House, Kingsway, price 7s. 6d.

(xv) The weight of any cylinder of a given type should not be less than an agreed minimum dependent upon the designed thickness.

(xvi) Cylinders should be periodically examined to determine the amount of corrosion and to ascertain that there are no surface defects.

(xvii) Each cylinder should undergo the hydraulic test specified in paras. 38 and 39 at least once in two years.

(xviii) If in the case of any particular cylinder, re-heat-treatment is considered to be desirable, that specified in para. 28 should be given. After this re-heat-treatment the cylinder should again be thoroughly examined and be subjected to the hydraulic test.

(xix) A record should be kept of all tests made at the cylinder maker's works, and copies forwarded to the purchasers of the cylinders.

(xx) Provided that the valves are adequately protected by screwed-on caps, cylinders need not be protected by coir mats.

(xxi) All cylinders should be marked with:—

- (a) Manufacturer's and owner's mark and rotation number.
- (b) Last date of hydraulic test.
- (c) Last date of heat treatment.
- (d) A mark indicating the specification to which the cylinder has been made.

All marks except those of the manufacturer which may be on the base should be made on the necked end of the cylinder and should be permanent and easily visible."

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