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SAFETY CODE FOR WORKING IN COMPRESSED AIR

(First Revision)

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Indian Standard

SAFETY CODE FOR WORKING IN COMPRESSED AIR

(First Revision)

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Indian Standard

SAFETY CODE FOR WORKING IN COMPRESSED AIR

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 31 October 1977, after the draft finalized by the Safety in Construction Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Many works in the field of civil engineering construction, such as under-water works, deep foundations and tunnel works require workmen to carry out their jobs in compressed air. Working in such conditions requires several precautions to be observed to safeguard the workmen against severe hazards to life, compressed air disease and related ailments.

0.3 Adoption of these predetermined safety measures in the operations relating to compression and decompression and working in compressed air will not only reduce accidents to the minimum but also promote quicker and risk-free working of the workmen resulting in increased efficiency alongwith reduced cost of construction. This standard has, therefore, been formulated with a view to give necessary guidance with regard to safety requirements, to all those entrusted with the execution of work in compressed air.

0.4 This standard was first published in 1967. In this revision, Amendment No. 1 has been incorporated completely. Besides, a number of other modifications have been made and these relate to the size of man-lock, sources of air for medical-lock, etc. In this revision new set of decompression tables have been included, the adoption of which will ensure greater safety to the workmen.

0.5 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in this field in this country.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. This number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard lays down the safety requirements for work in compressed air undertaken in construction works, such as foundations of bridges, docks and tunnels.

1.2 This standard does not cover working conditions of dress divers with helmet equipment.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 **Air-Lock** — A chamber designed to facilitate passage of men and materials, from an air pressure greater than normal, as in compartment, tunnel or well to normal air pressure or vice-versa.

2.2 **Bulk Head** — An air-tight structure separating the working chamber from free air or another chamber under a lesser pressure than the working pressure.

2.3 **Man-Lock** — An air-lock through which only men pass.

2.4 **Medical-Lock** — An air-lock to which men suffering from compressed air disease (caission disease) may be removed for medical attention.

2.5 **Normal Air Pressure** — The atmospheric pressure at sea level (1 kg/cm^2) or zero kg/cm^2 in gauge pressure.

2.6 **Pressure** — The pressure indicated by a properly calibrated gauge showing zero pressure at sea level.

2.7 **Total Pressure (Absolute Pressure)** — Gauge pressure plus normal air pressure.

2.8 **Doctor** — Any qualified medical practitioner conversant with compressed air disease (caission disease).

*Rules for rounding off numerical values (*revised*).

2.9 Working Period — When used in relation to a person shall mean the period or sum of periods during which, since last subject to ordinary atmospheric pressure for at least five consecutive hours, the person has been under pressure in a working chamber or chambers. The expression working chamber shall include any place other than a lock in which the person is for the purpose of compression or decompression (*see also* Appendix C).

2.10 Basic Pressure — It shall mean the highest pressure to which the person has been exposed in the course of his working periods. This is also the pressure on which the procedure for the decompression of a person shall be based (*see also* Appendix C).

3. GENERAL

3.1 There shall be present at all times, at least one competent person representing the employer who shall be familiar with this standard and take charge of compressed air operations.

3.2 Charts indicating the times for compression and decompression shall be pasted in a conspicuous place at the entrance of each air-lock.

4. EQUIPMENT

4.1 Every bulkhead, air-lock, or other structure used shall be of good construction, sound materials and adequate strength and shall be properly maintained.

4.2 The plant for production and supply of compressed air to any working chamber or air-lock shall be of suitable design, and in the case of a working chamber shall deliver a supply sufficient to provide 0·3 m^3 of fresh air per minute per person at the pressure in the chamber and not atmospheric pressure. Where electric or diesel compressors are used, compressed air shall be filtered before being pumped in. The plant shall be in the immediate charge of a competent person who shall be in attendance while any person is in compressed air. It shall be the responsibility of the said competent person that adequate supplies of fresh air are being received all the time by the persons working in the compressed air. The air lift valve and outlet valve shall be kept adequately open for this purpose.

4.2.1 To ensure a continuous supply of fresh air to workmen particularly at a stage when no air is escaping from the working chamber, means shall exist for the escape of foul air. Also circulation of fresh air in the chamber shall be ensured.

4.3 Every man-lock shall be of minimum internal dimensions as given in Fig. 1. The man-lock shall be large enough so that those using it are not compelled to be in a cramped position and shall not have less than 1·8 m clear head room at the centre and a minimum of 0·85 cubic metre of air

space per occupant. The man-lock shall be suitably equipped with the following:

a) Accurate pressure gauges which will readily indicate:

i) to the man-lock attendant the pressure in the man-lock and the pressure in each working chamber to which the man-lock affords direct or indirect access, and

ii) to persons in the man-lock pressure in the man-lock.

b) A clock or clocks in a suitable position so that man-lock attendant and persons in the man-lock can readily ascertain the time.

c) Efficient means, such as bells or whistles enabling the persons in the lock to convey visible or non-verbal signals to the lock attendant outside. Telephones shall be installed, where possible.

NOTE — Any code of signals used shall be kept conspicuously pasted within the working place entrances and such other locations as may be necessary to bring them to the attention of all persons concerned.

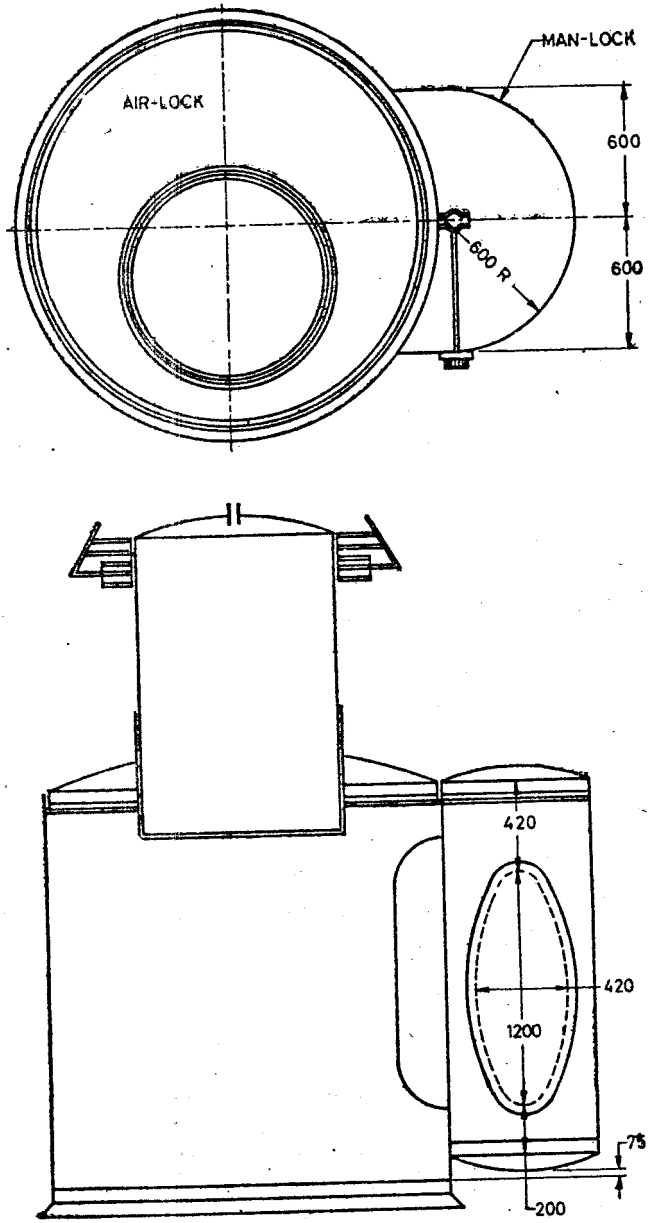
d) Efficient means enabling the lock attendant, from outside the lock to reduce or cut off the supply of compressed air into the lock and working chamber.

4.4 Valves or taps for controlling the flow of air into or from the air-lock shall be such as to enable the flow to be controlled with sufficient accuracy to ensure compliance with the provision laid down in **5.3.** These valves or taps shall be of non-return type.

4.5 The arrangement shall be such that persons in the lock cannot reduce the air pressure except under the control of the lock attendant (*see also* **5.2**).

4.6 All electrical installations inside the air-lock shall be of flame-proof type conforming to the relevant Indian Standards. Lighting of 4·5 lux intensity shall be provided. Any emergency reserve circuit supplied by an independent source, such as batteries is desirable. The complete installation shall be flame-proof.

4.7 All the equipment shall be subjected to initial inspection and certification immediately after its manufacture. The pressure up to which initial testing shall be carried out shall be $1\frac{1}{2}$ times the maximum working pressure. Thereafter, all the equipment shall be thoroughly inspected at least after every $1\frac{1}{2}$ months of working and every time it is shifted and reinstalled and certified to be in safe working condition by a competent person. A proper record of such inspections shall be kept in a register to be maintained at the site of work.



All dimensions in millimetres.

FIG. 1 TYPICAL SKETCH OF MAN-LOCK

4.8 To cater for emergency it is preferable to have a stand-by compressor of adequate capacity. However, where it is not possible to provide a stand-by compressor, the receiver shall be of sufficient capacity so as to maintain the working pressure for at least four hours.

4.9 Adequate access through the bulk heads and sufficient ladders for men to leave working faces shall be provided. Whenever practicable escape routes through air tight bulk heads in tunnels shall be in the corner.

5. DUTIES OF LOCK ATTENDANTS AND RULES WITH REGARD TO COMPRESSION OR DECOMPRESSION

5.1 Every man-lock shall, whilst any person is in that man-lock or in a working chamber to which the man-lock affords direct or indirect access, be in the charge of a competent lock attendant who shall control the rate of compressions and shall perform all decompressions in the man-lock. Where persons are employed in compressed air at a pressure exceeding 1·25 kg/cm² the lock attendant shall enter in a register (*see* Appendix A), the following:

a) The times at which each person enters and leaves the man-lock,

b) The pressures in the working chamber at the time of his entering and leaving the working chamber, and

c) The time taken to decompress each person and such other particulars as may be required with regard to conditions in the man-lock or working chamber.

5.2 If so authorized by the employer, the lock attendant may allocate to a competent person who is to undergo compression in the lock the following duties to be performed from inside the lock:

a) Regulating the admission of compressed air in accordance with Appendix B.

b) Signifying to him (unless the lock attendant is clearly aware of it) any complaint of discomfort by a person in the lock and any report by that person that the discomfort has ceased, subject to his overall control of the admission of the decompressed air in the lock.

5.3 Compression of a person in the man-lock shall be carried out only in accordance with requirements laid down in Appendix B. Decompression of a person after being in the compression chamber shall be carried out in accordance with requirements laid down in Appendix C.

NOTE — These requirements shall not apply in case of emergency, recompression and subsequently decompression of a person on health grounds.

5.4 Except in an unforeseen emergency, no person shall be compressed to a pressure exceeding 3·5 kg/cm².

5.5 Where a person who has, within the immediately preceding period of five hours, been exposed to a pressure greater than 1·25 kg/cm^2 is to be compressed in a man-lock other than the lock in which he was last decompressed, he shall, before compressions, produce to the lock-attendant written particulars, signed by the lock-attendant of the lock where he was last decompressed, indicating his last working period as defined in **2.9**. The said particulars shall, as soon as practicable, be entered in the prescribed register for the lock where he is compressed and shall, as soon as practicable, be communicated to the attendant at any other lock from which the person is liable to return to the open air.

6. EGRESS FROM WORKING CHAMBER

6.1 Whilst any person is in a working chamber the door between such chamber and any man-lock providing for his egress towards a lower pressure and not in use shall be kept open except when this is not reasonably practicable.

7. TEMPERATURE IN WORKING CHAMBER

7.1 A wet bulb thermometer, in good working order, shall be provided in every working chamber. Mercury thermometers shall not be used. Alcohol or other thermometers using non-toxic materials shall be used.

7.2 No person shall be employed or allowed to remain in any part of a working chamber under pressure where the wet bulb temperature exceeds 29°C except where and when his presence is essential for work which has to be done and all reasonably practicable steps have been and are being taken towards securing that the wet bulb temperature does not exceed that figure.

8. EMPLOYMENT OF PERSONS WITHOUT PREVIOUS EXPERIENCE

8.1 No person shall be employed on work in compressed air unless he has had previous experience of such work or, if he has not had such experience, is under the supervision of a person experienced in such work. In the case of person not previously employed in compressed air, compression shall not be carried out unless he is accompanied in the man-lock by a person competent to advise him as to the appropriate conduct of persons during compression.

NOTE — Men going under air pressure for the first time shall be instructed on how to avoid itself from the pressure of air upon ear-drums. This can be accomplished by continually swallowing as the air pressure is increased or by holding the nose and blowing as this action tends to increase the freedom with which the air can pass through the Eustachian tube into the middle ear thereby equalizing the pressure on the inner and outer surface of the ear-drum.

9. IDENTIFICATION BADGES

9.1 Every employee shall be furnished with an identification badge carrying at least the following information:

a) That the employee is compressed air worker,

b) The location of medical lock, and

c) That in case of emergency, the employee shall be taken quickly to the medical lock and not to hospital or police-station.

10. MEDICAL SUPERVISION AND CERTIFICATION

10.1 No person shall be employed where the pressure exceeds 1·25 kg/cm^2 unless he has, within the previous four weeks, been examined and certified to be fit for employment to compressed air.

10.2 Where persons are employed in compressed air, their employer shall make arrangements for their medical supervision by a doctor and for their medical examination at a suitable place or places in accordance with the provisions of **10.3** to **10.5**.

10.3 No person shall be employed in compressed air, unless he has been examined by a doctor and certified by him, by signed entry in that person's compressed air health register (*see* Appendix D), to be fit for such employment and either:

a) the date of such certificate shall not be more than three days earlier to the first entry in the air chamber; or

b) the person shall have been so employed within the previous three months having been certified to be fit for such employment and shall not have suffered since the date of that certificate from any injury, disease or illness causing an incapacity for work of more than two days' duration.

10.4 If a person is suffering from cold in the head, sore throat, ear-ache or any other ailment which is likely to render him unfit, he shall not be employed in compressed air until he has been again examined by a doctor and certified by him to be fit for such employment.

10.5 A doctor may, on examining or re-examining a person who has been or is proposed to be employed in compressed air, vary or revoke, by signed entry in that person's compressed air health register, any current certificate as to his fitness for employment in compressed air, and if such certificate is revoked that person shall not thereafter be employed in compressed air until he has, since revocation, been certified by a doctor, by signed entry in his said health register, to be fit for such employment.

11. MEDICAL-LOCK

11.1 Where the pressure in the working chamber exceeds 1·25 kg/cm² a suitably constructed medical-lock shall be provided and maintained and used solely for the treatment of persons working in compressed air.

11.2 The medical-lock (*see* Fig. 2) shall be of not less than 180 cm clear head room at its highest point and shall have two compartments so that lock can be entered while under pressure and shall be kept properly heated, lighted and ventilated. Each door shall be provided with bull's eyes and fitted with air valve so arranged as to be operated from within and without. The lock shall be provided with suitable equipment including couch not less than 2 m length, blanket, dry woollen garments and food lock, efficient means of verbal communication, such as intercom/telephone and of giving non-verbal signals between the inside and outside of the lock and between the two compartments, and a window or windows through which persons in either compartment can be observed from outside.

11.3 The medical lock shall be provided with sources of air, free of oil and carbon mono-oxide, for normal and emergency use which are capable of raising the air pressure in the lock from 0 to 5·27 kg/cm² in 5 minutes.

11.4 Such lock shall be under the complete control of the physician incharge and there shall be maintained in proximity to it a first-aid room, which shall contain all medical and surgical appliances necessary for first-aid, in case of accident.

12. DRINKS

12.1 Supply of Hot Drinks — Where persons are employed in compressed air at pressures exceeding 1·25 kg/cm² suitable arrangements shall be made for the supply of hot drinks to such persons when leaving the man-lock and when at any medical-lock.

12.2 Consumption of Alcohol — No person employed shall consume alcohol whilst in compressed air nor shall any person under influence of alcohol be permitted to enter for work.

13. SAFETY AGAINST FIRE HAZARD

13.1 No person shall be allowed to carry any flammable materials like matches inside the air-lock, and nobody shall be allowed to smoke inside.

13.2 Approved type of electric lamp, hand lamps and torches shall be used.

14. DETECTION OF GAS

14.1 Persons holding gas-testing certificates issued by Chief Inspectorate of Mines shall be employed for the detection of methane or other hazardous gases and for this purpose approved type of methanometer shall be used.

All dimensions in millimetres.

FIG. 2 TYPICAL SKETCH OF MEDICAL-LOCK

14.2 Samples of air inside the well at the bottom and also at the top shall be taken at least once in eight hours and tested for the presence of methane and other hazardous gases and for deficiency of oxygen.

14.3 In case methane or any other hazardous gas is detected it shall be immediately reported to the employer and the work in compressed air shall be stopped.

14.4 For further progressing of work at such sites possibility of means other than working in compressed air shall be investigated and in any case all precautions necessary for working in gaseous mines shall be satisfied all the time, in consultation with an expert competent to work in such mines.

15. HOURS OF WORK

15.1 Hours of work for workmen who are subjected to compression and decompression shall not be more than that specified below in any consecutive 24 hours:

Pressure, kg/cm²		*Number of Hours Excluding the Periods for Compression and Decompression*
Min	*Max*	
0	1·25	8 (normal working)
1·25	2·2	6
2·2	3·4	4

16. GENERAL

16.1 In case of air-locks where blasting is done, the blasts shall be carefully controlled and all precautions regarding blasting as laid down in IS : 4081-1967* shall be followed. The workers shall be permitted to start the work only after an inspection of the area by a qualified person nominated by the employer.

16.2 Apart from the air-lock, the well steining and connecting arrangement shall be designed keeping in view the air pressure acting on them during the course of pneumatic sinking.

16.3 Only compressed air tools shall be used. Electric tools shall not be used. Air required for pneumatic tools shall be cooled and purified in the same way as air for working chamber.

*Safety code for blasting and drilling operations.

APPENDIX A

(*Clause* 5.1)

SPECIMEN FOR FORM NO. 1 (LOCK ATTENDANT'S REGISTER)

Normal procedure for pressures over 1·25 kg/cm²

Name of Firm.....Date.....Name of Lock Attendant.....

Address of Site.....Period of Shift.....Wet Bulb Temperature in Working Chamber and Time of Record.....

Name and Work Number	Compression				Decompression					
	Pressure in Working Chamber kg/cm²	Time of Entry Into Lock	Time of Leaving Lock to Enter Working Chamber	Compression Time min	Pressure in Working Chamber kg/cm²	Shift Period h	Time of Entry into Lock on Leaving Working Chamber	Time and Gauge Pressure When Gradual Decompression is Started	Time of Leaving Lock After Decompression	Decompression Time min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

APPENDIX B

(*Clauses* 5.2, 5.3 *and* C-3.3)

PRESSURE AND TIME REGULATION FOR COMPRESSION

B-1. DETAILED PROVISIONS

B-1.0 Provisions detailed in **B-1.1** to **B-1.5** shall be followed with regard to regulations of pressures and time for compression.

B-1.1 The pressure shall not, in the first minute, after starting compression, be increased to more than 0·35 kg/cm^2.

B-1.2 When that pressure is reached, the pressure shall not be further increased until after the lapse of a period sufficiently long to enable the lock attendant to discover whether or not any person in the man-lock complains of discomfort.

B-1.3 After the lapse of that period, the pressure shall not be increased at a rate faster than 0·7 kg/cm^2/min.

B-1.4 The pressure shall then be increased gradually so as to ensure, as far as practicable, that no person suffers discomfort.

B-1.5 If any person complains of discomfort and such complaint is signified to the lock attendant any compression then proceeding shall be immediately stopped. Unless the person who complained of discomfort quickly reports that the discomfort has ceased and such report is conveyed to the lock attendant, the lock attendant shall, without further delay, gradually reduce the pressure in the lock until the person reports that the discomfort has ceased. If he does not so report the pressure shall be reduced gradually to atmospheric pressure and the person released from the lock.

APPENDIX C

(*Clauses* 2.9, 2.10 *and* 5.3)

PRESSURE AND TIME REGULATIONS FOR DECOMPRESSION

C-1. GENERAL PRINCIPLE

C-1.1 For arriving at the basic pressure defined in **2.9**, sudden and exceptional variations of pressure not involving excess pressure of more

than 0·35 kg/cm², for a very short time may be disregarded. However, where during the whole of his period, a person about to be decompressed, has been in working chamber in which (as in tidal waters) the pressure has varied more than 0·35 kg/cm², the basic pressure shall be the mean of pressures half way through that period and at the end of it.

C-1.2 Provisions laid down in this appendix shall not, however, apply to the decompression of a person who has not, in the course of his working period, been exposed to a pressure exceeding 1·25 kg/cm².

C-2. NORMAL PROCEDURE

C-2.1 Except the provision laid down for decanting under **C-3**, procedure detailed under **C-2.1.1** and **C-2.1.2** shall be followed while resorting to decompression.

C-2.1.1 In the case of each person to be decompressed his 'basic pressure' and his 'working period' shall be ascertained and the decompression resorted to in accordance with the details given in Tables 1 to 8 as may be applicable. Where two or more persons are being decompressed in a man-lock and their periods of exposure or their maximum working pressure do not fall within the same range, the compression procedure shall be based upon the highest working pressure and the longest period of exposure experienced by any one of the men concerned.

C-2.1.2 The pressure shall be reduced at the rate of about 0·4 bar per minute to, but not lower than, the first stage according to the tables. At this stage the pressure shall be retained for the prescribed number of minutes before further reducing the pressure at the same rate as before to the next stage and so on.

C-3. DECANTING

C-3.1 Decanting shall mean rapid decompression of persons in a man-lock to atmospheric pressure, followed promptly by their recompression in a separate decompression chamber, where they will be decompressed according to the tables.

C-3.2 Instead of compliance with the provision laid down under **C-2.1** for decompression, the procedure for decanting as laid down in **C-3.3** may be resorted to under the following conditions:

a) Where it is not practicable to provide opening directly to air atmospheric pressure and as a means of egress to the open air from a place or places where persons are employed in compressed air.

b) When compliance with the provision under **C-2** regarding rates of decompression would, in view of number of workmen concerned in conjunction with the long delay which would be involved in affording them egress from the working chamber or chambers, seriously interfere with the carrying on of the work or be likely to be detrimental to their safety or health.

C-3.3 The following provisions shall apply in connection with decanting:

a) A separate decompression chamber shall be provided and shall be suitably situated (*see* d).

b) The doctor shall be specifically informed by the employer that decanting is to be carried out at the site in question.

c) Recompression in the decompression chamber shall be to a pressure, as nearly as practicable, to the pressure in the working chamber from which the persons in the decompression chamber entered in the man-lock in which they were decompressed. Provisions detailed under Appendix B shall not apply to such recompression. However provisions of **C-1.1** and **C-2.1** shall apply to their subsequent recompression in the decompression chamber as if it were decompression in the man-lock.

d) The total time spent on:

i) the primary decompression in the man-lock;

ii) going from that man-lock to the separate decompression chamber; and

iii) recompression that chamber shall be the minimum possible. However, the time taken for operation 2 shall not exceed 5 minutes and that for 3 shall not exceed 3 minutes.

e) The procedure to be followed for decanting shall be approved by the doctor who shall satisfy himself regarding the adequacy of the arrangement made and practicability of complying with the requirements of this appendix.

APPENDIX D

(*Clause* 10.3)

SPECIMEN OF FORM NO. 2 (COMPRESSED AIR HEALTH REGISTER)

Certificate of Examination of the Person as Regarding His Fitness for Employment in Compressed Air Work

Name.....

Address.....

Date of Birth.....

Doctor's Name, Address and Telephone Number.....

Date of Examination	Name of Employer and Site Address	Result of Examination and any Conditions Affecting Employment in Compressed Air	Signature of the Doctor
(1)	(2)	(3)	(4)

TABLE 1 DECOMPRESSION TABLE — EXPOSURE PERIOD 0 TO ½ h

(*Clauses* C-2.1.1, C-2.1.2 *and* C-2.1.3)

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2									—
1·2 ,, 1·4									—
1·4 ,, 1·6									—
1·6 ,, 1·8									—
1·8 ,, 2·0									—
2·0 ,, 2·2								5	5
2·2 ,, 2·4								5	5
2·4 ,, 2·6								5	5
2·6 ,, 2·8								5	5
2·8 ,, 3·0							5	5	10
3·0 ,, 3·2							5	5	10
3·2 ,, 3·4							5	10	15

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 2 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER ½ h to 1 h

(*Clauses* C-2.1.1, C-2.1.2 *and* C-2.1.3)

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2									—
1·2 ,, 1·4									—
1·4 ,, 1·6								5	5
1·6 ,, 1·8								5	5
1·8 ,, 2·0								10	10
2·0 ,, 2·2							5	15	20
2·2 ,, 2·4							5	20	25
2·4 ,, 2·6							10	25	35
2·6 ,, 2·8						5	10	35	50
2·8 ,, 3·0						5	15	40	60
3·0 ,, 3·2					5	5	20	40	70
3·2 ,, 3·4					5	10	25	40	80

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 3 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER 1 h to 1½ h

(Clauses C-2.1.1, C-2.1.2 and C-2.1.3)

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2								—	—
1·2 „ 1·4								5	5
1·4 „ 1·6								10	10
1·6 „ 1·8							5	15	20
1·8 „ 2·0							5	30	35
2·0 „ 2·2						5	10	35	50
2·2 „ 2·4						5	20	35	60
2·4 „ 2·6						10	25	40	75
2·6 „ 2·8					5	10	30	45	90
2·8 „ 3·0					5	20	35	45	105
3·0 „ 3·2				5	10	20	35	45	115
3·2 „ 3·4				5	15	25	35	45	125

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 4 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER 1½ h to 2 h

(Clauses C-2.1.1, C-2.1.2 and C-2.1.3)

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2								5	5
1·2 „ 1·4								10	10
1·4 „ 1·6							5	20	25
1·6 „ 1·8							10	30	40
1·8 „ 2·0						5	15	35	55
2·0 „ 2·2						5	25	40	70
2·2 „ 2·4					5	10	30	40	85
2·4 „ 2·6					5	20	35	40	100
2·6 „ 2·8				5	10	25	35	40	115
2·8 „ 3·0				5	15	30	35	45	130
3·0 „ 3·2			5	10	20	30	35	45	145
3·2 „ 3·4			5	15	25	30	35	45	155

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 5 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER 2 h to 2½ h

(Clauses C-2.1.1, C-2.1.2 *and* C-2.1.3 *)*

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2								5	5
1·2 ,, 1·4								20	20
1·4 ,, 1·6							5	30	35
1·6 ,, 1·8							15	40	55
1·8 ,, 2·0						5	25	40	70
2·0 ,, 2·2					5	10	30	45	90
2·2 ,, 2·4					5	20	35	45	105
2·4 ,, 2·6				5	10	25	35	45	120
2·6 ,, 2·8				5	20	30	35	45	135
2·8 ,, 3·0			5	10	20	30	35	45	145
3·0 ,, 3·2		5	5	15	25	30	35	45	160
3·2 ,, 3·4		5	10	20	25	30	40	45	175

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 6 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER 2½ h to 3 h

(Clauses C-2.1.1, C-2.1.2 *and* C-2.1.3 *)*

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2								10	10
1·2 ,, 1·4							5	20	25
1·4 ,, 1·6							10	35	45
1·6 ,, 1·8						5	20	40	65
1·8 ,, 2·0						10	30	40	80
2·0 ,, 2·2					5	15	35	40	95
2·2 ,, 2·4					10	25	35	45	115
2·4 ,, 2·6				5	15	30	35	45	130
2·6 ,, 2·8			5	10	20	30	35	45	145
2·8 ,, 3·0			5	20	25	30	35	45	160
3·0 ,, 3·2		5	10	20	25	30	40	45	175
3·2 ,, 3·4	5	5	15	25	25	30	40	45	190

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 7 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER 3 h to 4 h

(Clauses C-2.1.1, C-2.1.2 and C-2.1.3)

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2								15	15
1·2 ,, 1·4							5	30	35
1·4 ,, 1·6							15	40	55
1·6 ,, 1·8						5	25	45	75
1·8 ,, 2·0					5	15	30	45	95
2·0 ,, 2·2					10	20	35	45	110
2·2 ,, 2·4				5	15	25	40	45	130
2·4 ,, 2·6			5	5	25	30	40	45	150
2·6 ,, 2·8			5	15	25	30	40	45	160
2·8 ,, 3·0		5	10	20	25	30	40	45	175
3·0 ,, 3·2	5	5	15	25	25	30	40	45	190
3·2 ,, 3·4	5	15	20	25	30	30	40	45	210

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

TABLE 8 DECOMPRESSION TABLE — EXPOSURE PERIOD OVER 4 h

(Clauses C-2.1.1, C-2.1.2 and C-2.1.3)

Maximum Working Pressure (Bar) (*see* Note 3)	Stage Pressure (Bar) (*see* Note 1)								Total Time, min (*see* Note 2)
	1·8	1·6	1·4	1·2	1·0	0·8	0·6	0·4	0·2	
1·0 to 1·2									20	20
1·2 ,, 1·4								5	35	40
1·4 ,, 1·6							5	20	40	65
1·6 ,, 1·8							10	30	45	85
1·8 ,, 2·0						5	20	35	45	105
2·0 ,, 2·2					5	10	25	40	50	130

Note 1 — Decompression both to the first stage and between stages shall be at rates not faster than 0·4 bar/min.

Note 2 — Not including time between stages.

Note 3 — For borderline values of the maximum working pressure use the longer procedure.

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