

SPECIFICATION FOR SELF CONTAINED COMPRESSED AIR OPEN CIRCUIT BREATHING APPARATUS AS PER IS 10245 (Part-2)-1994.

1. SCOPE

This specification prescribes requirements of design, performance and practical test for open circuit type breathing apparatus.

2. GENERAL REQUIREMENT

2.1 The compressed air breathing apparatus shall be so designed so that the wearer can breathe comfortably, without any risk of poisonous gases entering the breathing circuit. The breathing circuit should be so designed so that there is optimum utilization of compressed air stored in the cylinder during Fire Fighting and rescue operations. The set as a whole shall be so designed so that the handling of the set is easy and does not cause any damage to the set. Set shall be capable of being used with cylinders having working pressure up to 300 bars at least. The BA set should have no air losses. No toxic matter can enter the mask back plate should be ergonomically designed for comfort and stability and there should be provision of connection between wearers.

2.2. MATERIAL

All the materials used in the construction shall have adequate mechanical strength, durability and resistance to deterioration by heat or by contact with seawater or plain water. Such materials shall be antistatic and fire resistant as far as practicable.

2.2.2 Exposed parts excluding cylinders, that is, those, which may be subjected to impact during practical performance tests, shall not be made of magnesium, titanium, aluminum or alloys containing such proportions of these metals which on impact give rise to frictional sparks capable of igniting flammable gas mixtures.

2.2.3. Materials that may come into contact with the skin shall be non staining soft, pliable and shall not contain dermatitis substances.

2.2.4. The apparatus shall be sufficiently robust to withstand the rough usage, it is likely to receive in service and designed so that it will continue to function satisfactorily while temporarily accidentally submerged in water at a maximum depth of one meter and thereafter until the air in the cylinder is exhausted.

2.4. SEPARATION OF PARTS

The design and construction of the apparatus shall permit its components parts to be readily separated for cleaning, Examination and testing. The couplings required to achieve this shall be readily connected and secured where possibly by hand, and means for sealing used shall be retained in position when the joints and couplings are disconnected during normal maintenance.

2.5. **ADJUSTABLE PARTS**

All parts requiring manipulation by wearer shall be readily accessible and easily distinguishable from one another by touch. All adjustable parts and controls shall be so constructed that their adjustment is not liable to accidental alteration during use.

2.6. **WEIGHT**

The weight of the apparatus shall not exceed 14 Kg. The cylinder used for compressed air should have the approval of Chief Controller of Explosives/PESO, Nagpur.

2.7. **LEAK TIGHTNESS**

The apparatus shall be of positive pressure type so as to prevent ingress of the external atmosphere. There should be no leakage from any joint.

2.8. Air line connection and second user connection and inlet-cum-outlet shall be provided on the pressure reducer for attaching, airline connection for second user connection.

3. **FACE MASK**

3.1 The face mask should be made either of Neoprene or Silicone. The air inlet valve should connect to the mask by simply clipping it on to enable wearer to switch on the positive pressure at the last minute.

3.2. Face mask shall cover the eyes, nose, mouth and chin, it shall be provided with an additional flap for providing adequate sealing on the face of the wearer of the breathing apparatus against the outside gas, when the skin is drying or moist, when the head is moving.

3.3. The face mask shall have an inner mask to reduce misting and dead space so that the mask always remaining at center.

3.4. Face mask shall be secured to the face by means of an adjustable/replaceable head harness and it shall be fitted with a neck strap to support them when not being worn. There shall be five head harness and one strap i.e. the top one should be prefixed.

3.5. Means for speech transmission shall be incorporated and so designed that it is in front of the mouth.

3.6 The face mask shall be constructed of silicon rubber in order that it is soft, light in weight, comfortable to the wearer to wear for long duration, resistant to chemicals and heat, thus having longer life.

3.7 The connection for demand valve shall be provided in front of the Face Mask.

3.8 The visor shall be made of clear polycarbonate.

4. **FACE CONNECTOR**

The connection between the face mask and the demand valve shall be of Click-on/Push fit type well secured so that, the set is having fully automatic positive pressure, there is optimum utilization of compressed air stores in the cylinder and the mask by mistake is not used with a filter canister.

5. **HEAD HARNESS**

The head harness shall hold the face mask firmly and comfortably in position. It shall be moulded from silicon rubber. It should be easily detachable for cleaning and decontamination. There shall be five quick release harnesses out of which only 4 shall need to be tightening with the 5th i.e. top one shall be prefixed to ensure quick donning.

6. **BODY HARNESS**

The body harness shall be designed to allow the user to don the apparatus quickly and easily without assistance and shall be adjustable for fit. Buckles fitted to waist and shoulder harness shall be so constructed that once adjusted they will not slip.

7. **EXHALATION VALVE**

The apparatus shall be provided with an unidirectional exhalation valve spring loaded to maintain positive pressure in the face mask. The resistance of the valve should not exceed 6 milli bars, it shall be protected against dirt and mechanical damage.

8. **DEMAND VALVE**

It shall be fully automatic positive type. Designed to provide a flow rate of at least 150 ltrs /min at all cylinder pressure of 10 bar. It shall be designed to push fit/click on to the mask.

9. **SUPPLEMENTARY SUPPLY**

The apparatus shall be provided with a manually operated push type means on the demand valve itself for supplementary supply.

10. **HIGH PRESSURE TUBE**

It shall be having outer covering of neoprene rubber. The test pressure of the tube shall be above 600 bar. It shall be fitted to the set in a manner that it cannot be separated by hand. The entire high pressure tube shall be covered by a medium pressure tube having medium pressure supply for safety reasons.

11. **MEDIUM PRESSURE TUBE.**

It shall be having outer covering of neoprene rubber. The test pressure of the tube shall be above 20 bar. It shall be so designed that it can be separated by hand and cannot be fitted at the joints where High Pressure Tube is fitted.

12. **PRESSURE GAUGE**

- 12.1 It shall indicate pressure on opening of the cylinder. The range shall be 0-350 bars. It shall be placed such that the wearer can easily see the pressure while using the set.
- 12.2 The pressure gauge shall have a blowout release. The blowout release should be so located that in the event of an explosion or fracture of the pressure element of the gauge, the blast will be away from the front. The gauge window shall be made of material of non-splintering glass or of clear plastic materials.
- 12.3 A tap or restrictor shall be provided so that if pressure gauge and connection hose are removed from the apparatus, flow will not exceed 25 lit/Min at full cylinder pressure, if the gauge or flexible connecting tube be damaged after the apparatus has been functioning for a period of time equal to half the nominal working duration with an air consumption of 40 l/min the loss of air from the damaged component shall not reduce the normal effective duration of the apparatus by more than the reserved period.

13. **WARNING DEVICE**

The apparatus shall be provided with warning whistle next to the pressure gauge. It shall be consuming minimum amount of compressed air and should emit continuous at least 90 dbls sound. Warning whistle next to pressure gauge enables the user to ascertain his whistle and can check the same.

14. **BACK PLATE**

It is to be made of non-metallic GRP reinforced or equivalent material resistant to heat and chemicals. It should not be made of steel or metal (with or without any covering or coating) to avoid heating and slipping of the entire set. Rubber sheeting prevents ventilation. The back plate shall be so designed that the user can lift the set by having a firm grip of back plate in order to avoid lifting of set from cylinder valve or body harness. The method of fixing cylinder shall be such that 4, 6 and 9 liter cylinder of working pressure 200/207/300 bar can be fitted without any alternation.

15. **PRESSURE REDUCER**

The apparatus shall be provided with a diaphragm less piston pressure reducer which is capable of reducing pressure from 300 bars to 7 bar (approx). The designing shall be such that back pressure development shall be minimum, second input / outlet shall be provided on the reducer. High pressure and medium pressure safety shall also be provided on the reducer.

16. **GAS CYLINDER & MAIN VALVE.**

Cylinder used shall be of steel having 6 liter water capacity, 300 bar working pressure 1800 Liters compressed air for 45 minute duration. The cylinder & valve should be approved by Chief Controller of Explosives / PESO, Nagpur, India.

17. **PACKING**

The breathing apparatus shall be packed in hard bag moulded plastic or FRP.

18. **MARKING**

The trademark of manufacturers Identification shall be marked on the facemask, demand valve, pressure reducer and back plate. The serial number of the set and the date of manufacturing shall also be marked on the back plate.

NOTE TO TENDERER :

1. The tenderer shall indicate the make/model in their offer.
2. The tenderer shall furnish the clause-by-clause compliance statement. In case there is any deviation the same should be clearly brought out in the offer.
3. They shall mention the relevant BIS/EN/DIN/UL certificate of the product offered.
4. Technical manual comprising of servicing details shall be supplied with system
5. Relevant Test certificates shall be provided from a Govt. approved laboratory or from the manufacturer, along with their offer.

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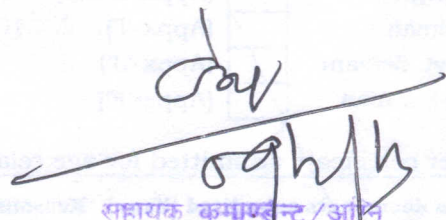
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सहायक कमाण्डेंट/आग्नि
Assistant Commander/Fire

ने गैसबल ईकाई बी एच ई एन हरिदा
CISF Unit BHEL Hardwar

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APPENDIX- 'B'

(A) PRE-QUALIFYING REQUIREMENT :-

1. Vendor should have supplied offered item/similar item to a customer in the past 5 years. Vendor to provide the name, address and contact details of the customer(s).
2. Vendor should submit satisfactory performance certificate of the equipment from above referred customer(s).
3. BHEL reserves the right to verify the supplied information from vendor's customer directly. Vendor shall render all possible help in this regard.

(B) TERMS & CONDITIONS:-

1. All parts of B.A. set should be confirming BIS & DGS & D approved.
2. The company must produce all the valid/relevant certificates like performance testing report along with their offer.
3. The cylinder and valve duly certified/ approved by Chief Controller of Explosive Nagpur.
4. The Pre-dispatch inspection & testing as per relevant specification will be Carried out at firm site & final acceptance at BHEL Haridwar Store site.


ASSTT.COMMANDANT/FIRE
CISF UNIT BHEL HARIDWAR