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भारत सरकार
रेल मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Technical Specification
for
Self Contained Breathing Apparatus

SPECIFICATION No.-MP – 0.08.00.57 (Rev-01)
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Issued by
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Price: Rs. 300/-

Technical Specification for self contained breathing apparatus

1. GENERAL:

- 1.1 The specification covers the requirements of design, manufacture, testing, supply and commissioning of self-contained breathing apparatus with all standard accessories. It shall be used during accident involving smoke subsequent to fire, LPG, Ammonia and other toxic gases or lack of oxygen.
- 1.2 The equipment shall conform to latest version of EN 137 or equivalent International standard. The tenderer shall indicate the specification to which offered equipment conforms to.
- 1.3 A brief description of the assembly of the breathing apparatus with diagram as well as technical parameters shall be submitted along with the offer.
- 1.4 The total weight of the breathing apparatus set along with the cylinder shall not exceed 18kg.. Tenderer shall submit the complete weight break-up with details of accessories supplied along with breathing apparatus.
- 1.5 The drawings/documentation shall be in S.I. units and all the relevant details shall be in English.
- 1.6 The offer shall be made in accordance with this specification, giving clause-by-clause comments. Deviation from the specification, if any, in order to improve the performance, availability and reliability of the breathing apparatus can be considered. All such proposals shall, however, be accompanied with complete technical details and justification for the proposed deviation.

2. CONTRACTOR'S RESPONSIBILITY:

- 2.1 The contractor shall be entirely responsible for execution of the contract strictly in accordance with the terms & condition of this specification/contract, notwithstanding any approval, which the purchaser or the nominated Inspecting Officer may have given:
 - a) Of the detailed drawings prepared by the contractor.
 - b) Of his sub-contractors for materials.
 - c) Of other parts of the work involved by the contractor.
 - d) Of the test carried out either by the contractor or by purchaser or the nominated Inspecting Officer.

3. QUALITY ASSURANCE PLAN:

- 3.1 The tenderer shall provide satisfactory evidence, acceptable to the purchaser, to the effect that the manufacturer has adequate machinery & plant facilities and that the firm follows a "Quality Assurance Programme". He should provide a list of same/similar items being supplied by him in the last three years.
- 3.2 The manufacturer shall have necessary facilities at his Works or at the Works of his sub-vendors for carrying out various load/performance tests on the equipment. In case, he intends to use some imported equipment, the necessary WTC from OEMs shall accompany such equipment.
- 3.3 The tenderer shall supply test certificates of breathing apparatus and its

accessories from an approved Test House. He shall provide similar test certificates for air cylinders also.

4. SCOPE OF SUPPLY:

4.1 Supply of one breathing apparatus complete with all accessories as detailed below :

- a) Cylinder and valve assembly.
- b) First stage reducer.
- c) Lung demand valve.
- d) Whistle.
- e) Pressure Gauge.
- f) Face mask.
- g) Body harness, Back plate assembly with cylinder anti-vibration strap.

4.1.1 The tenderer shall also quote, with details, for any additional equipment/accessory which will be required apart from the above mentioned items for efficient working of the apparatus.

4.2 The tenderer shall supply essential spares with each breathing apparatus along with quotation.

5. BASIC DESIGN FEATURES:

5.1 Air Cylinder with valve:

5.1.1 It shall be made of proven construction preferably Cr-Mo steel with water capacity of 6 litre at 300 bar pressure. The cylinder will be filled up with fresh and clean air required for breathing.

5.1.2 Tenderer shall indicate the air filling arrangement of the cylinder after these become empty. It shall be possible to fill the cylinder by a suitable compressor which can supply fresh and clean air required for breathing. Details of such compressor shall be furnished.

5.1.3 The cylinder outlet valve shall be suitably covered to prevent any accident due to accidental opening of valve and also to prevent the thread getting damaged. Cylinder valve shall be protected against blockage and transmission of particulate matter that may be contained in breathing compressed air. The valve shall be so designed and located that it cannot be closed inadvertently.

5.2 Pressure Reducer:

5.2.1 It shall be light, compact and sturdy in construction. It shall be protected against any unauthorized adjustment. It shall have a safety relief valve to release excess pressure in the demand valve during emergency.

5.2.2 It shall be capable of delivering upto 1000 lpm of air at 300 bar, as well as capable of delivering 500 lpm at as low as 20 bars.

5.3 Lung Demand Valve (LDV):

5.3.1 It shall be made to proven international specification. The material of the cover shall preferably be silicon. It shall be compact in size and shall have centrally located air supply switch-off button. The connection of valve to face mask shall preferably be by pushing mechanism for easy and quick connection.

5.3.2 It should be capable of delivering 50 lpm of air in emergency. It shall maintain a positive pressure even at low pressure of 10 bar. The lung demand valve shall be

first breath activated at a pressure of as low as 5 milibar.

- 5.3.3 While not in use, provision shall be made to plug on the LDV at a suitable location like waist belt. No additional care will be required to prevent the dust from entering LDV. It shall be easy to clean and maintain.

5.4 Whistle:

- 5.4.1 The apparatus shall have a suitable warning whistle, which will automatically activate when cylinder pressure drops to 50 ± 5 bar or at least when 200 litres of air remains in the cylinder, to alert the user. The whistle shall operate even at a relative humidity of 90 %.
- 5.4.2 The air consumed for operating the whistle shall not generally exceed 5 lpm for response even at a pressure of 10 bar. The tenderer shall indicate the value. The sound pressure of the whistle shall be at least 90 dB (A). The frequency range shall be within 2000 to 4000 Hz.
- 5.4.3 It shall be suitably positioned closed to ear so that the user can recognize the warning while working in hazard condition.

5.5 Pressure Gauge:

- 5.5.1 The apparatus shall be equipped with a reliable pressure gauge which shall read the pressure in the cylinder(s). The pressure gauge shall be so positioned that it is convenient to read the pressure while carrying out the rescue operation. The air tube connected to pressure gauge shall be of robust construction to withstand the rough usage.
- 5.5.2 The gauge shall be water resistant and shall withstand the pressure while carrying out under water rescue operation. The calibration of the gauge shall be such that it will be possible to read the pressure within 10 bar. The gauge shall be graduated from 0 to 350 bar. The gauge dial shall be of self-illuminating type so that the pressure can be read even in darkness.
- 5.5.3 The gauge window material shall be of non-splintering type.

5.6 Face Mask:

- 5.6.1 The face mask shall be of proven material and shall comfortably fit on the user's face with the help of suitable number of straps. It shall be ensured that there is no such material used in the face mask which can cause injury due to sharp edges. It shall have double reflex sealing to provide protection and shall be provided with preferably polycarbonate lens. The face mask shall fit on faces of all sizes. It shall provide wide field vision. It shall provide suitable perspiration drain to avoid skin irritation & hazy vision.
- 5.6.2 It shall be provided with spring loaded respiratory valve. The face mask shall have oral nasal mask perfectly fitting on the face to ensure the prevention of CO₂ build-up. The exhalation resistance shall be as low as possible.
- 5.6.3 It shall be provided with speech diaphragm for quality voice transmission.

5.7 Body harness, Back Plate Assembly with Cylinder Anti-Vibration Strap:

- 5.7.1 The back plate assembly shall preferably be made of fibre composite material. The back plate shall be made of chemical, heat and fire resistant material.
- 5.7.2 It shall follow the natural contours of the back of the person using it. It shall be ensured that the weight concentration will not offer any back strain to the user.
- 5.7.3 The body harness shall be so designed that the apparatus can be quickly &

easily worn or taken off without any external assistance. All adjusting device shall be so constructed that once adjusted, they will not slip inadvertently. The harness shall pass through the back plate to give proper fitment and it shall not be fixed to the back plate with buckles.

- 5.7.4 The strap for securing cylinder shall be provided with fail safe self-locking clamps. The back plate shall have rubber boot at bottom end to absorb impact. An anti-vibration strap shall be provided to prevent accidental opening of cylinder knob from back plate while in transit.

6 SERVICE CONDITIONS:

- 6.1 The equipment shall operate satisfactorily under the following climatic conditions.
- a) Variation of ambient temperature from 0° C to 55° C with 100% relative humidity.
 - b) Heavy rainfall with thunderstorms.
 - c) Dusty and corrosive atmosphere with dust content in air up to 1.6 gm/m³.
 - d) Altitude – Upto 1200 m above Mean Sea level.

7 INSPECTION & ACCEPTANCE TEST OF PROTOTYPE BREATHING APPARATUS:

- 7.1 Physical dimensions & weight check of each equipment shall be done as agreed and approved by the purchaser.
- 7.2 The inspection shall include the following checks:
- a) The apparatus can be quickly & easily worn or taken off without any external assistance.
 - b) Harness comfort while walking / working.
 - c) Accessibility of controls & pressure gauge.
 - d) Clarity of vision.
 - e) Speech transmission.
 - f) Warning device actuation at 50±5 bar cylinder pressure.
 - g) Any other comments reported by the user during inspection.
- 7.3 Performance tests shall be carried out as per EN 137 or equivalent specification in the presence of inspector nominated by purchaser.

8 COMMISSIONING AND TRAINING:

- 8.1 The supplier or his agent shall carry out a joint check at the consignee's premises, during unpacking of the equipment in order to ascertain short shipment or transit damages, if any.
- 8.2 The contractor or his agent shall commission the equipment within 30 days from the date of intimation by the consignee regarding receipt of equipment.
- 8.3 The contractor or his agent shall demonstrate performance of the equipment after receipt at the consignee's works. The consignee shall give a certificate in this regard that persons have completely learnt to use the Breathing apparatus. The consignee shall watch the equipment performance for a period of three months before issuing final proving test certificate.
- 8.4 Training shall be imparted by the supplier in operation & maintenance including repair of the equipment at the time of commissioning.

9 SPARE PARTS:

- 9.1 The supplier, along with the offer, shall furnish list of initial spares, maintenance spares as well as consumables spares for two years.
- 9.2 The manufacturer shall be responsible for the subsequent availability of spares to ensure continued trouble free service for entire life of the equipment.

10 TECHNICAL LITERATURE, SERVICE MANUALS AND SPARE PARTS CATALOGUE:

- 10.1 Detailed operating, maintenance and service manuals for the equipment along with technical literature and spare parts catalogue shall be specially prepared and at least two copies each shall be supplied free of cost per set of equipment ordered by the consignee. In addition, one copy of the above manuals & catalogue shall be dispatched to "The Director General (MP), RDSO, Lucknow – 226011".

11 SERVICE ENGINEERING AND AFTER-SALES SERVICE:

- 11.1 The contractor shall provide, at his own expense, the services of competent engineers, during commissioning as well as warranty period of the equipment.
- 11.2 The tenderer shall clearly bring out the facilities available with him or his sub-contractor for providing adequate after-sales service during warranty as well as post warranty period. The tenderer shall indicate the service organization at various places in India and the availability of trained staff, maintenance spares etc. at these places.

12 PACKING AND MARKING:

- 12.1 All the equipment shall be suitably packed to avoid damage during transit.
- 12.2 Marking shall be done on the tent & accessories with details like manufacturer's name, year of manufacturing, capacity etc.

13 WARRANTY:

- 13.1 The Breathing apparatus shall be guaranteed for its material quality. The offered accessories shall be guaranteed for satisfactory and trouble free operation for a period of 24 months from the date of commissioning. The contractor at his own expense at users premises shall replace any part of the equipment failing or proving unsatisfactory in service due to defective design, material or workmanship within 24 months from the date of commissioning. The contractor shall repair free of cost the damaged material of tent if the same takes place within this period. The replaced part shall again be subjected to guarantee of 24 months. The period 24 months would commence from the date the modified part is commissioned in service.
