

SPECIFICATION FOR CARBON COMPOSITE SELF CONTAINED COMPRESSED AIR OPEN CIRCUIT BREATHING APPARATUS

		Bidder to confirm	Mention deviation if any	remarks
1.0	SCOPE			
	This specification prescribes requirements of design, performance and practical test for open circuit type breathing apparatus.			
2.0	GENERAL REQUIREMENTS			
2.1	Self-contained breathing apparatus (SCBA), ergonomically designed, light weight glass and carbon filled nylon composite back plate and intrinsically flame retardant 100% kevlar webbing and 5 padded harness. Cylinder band should be made up of 100% Kevlar. Two stage pneumatic system compressing positive pressure demand valve with the hands free by pass facility, vision 3 face mask more than 85% field vision and scratch resistance polycarbonate visor should be provided. Warning whistle should have an operating pressure of 55 bars. First stage pressure reducer with single high pressure cylinder connector with steel braided hose. The apparatus is to be supplied with CCE approved 6/6.8 ltrs, 300 Bar High pressure Carbone composite cylinder (Duration 45/46 Mins)			
2.2	The unit is to be provided as attached with automatic distress signal unit capable of giving analogue and digital reading of the pressure			
2.3	Low pressure alarm and ADSU featuring a motion sensor which gives alarm if the user is motionless for 30 seconds.			
2.4	The BA set has to be CE approved, as per EN 137 class II 2006 standard.			
2.5	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 operation. 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 B A 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 have provision of connection between wearers.			
2.2	MATERIAL			
2.2.1	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 plane water. Such material shall be antistatic and fire resistance as far as practicable.			
2.2.2	Exposed parts excluding cylinders, that is, those, which may be subject to impact during practical performance test, 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	Material that may come into contact with the skin shall be non staining soft, pliable and shall not contain dermatitis substance.			
2.2.4	The apparatus shall be sufficiently robusted 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 there after until the air in the cylinder is exhausted.			
2.3	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 control shall be so constructed that there adjustment is not liable to accidental alteration during use.			
2.6	WEIGHT			
	The weight of apparatus shall not exceed 13.5 kg. The cylinder used for compressed air should have the approval of chief controller of explosive.			
2.7	LEAK TIGHTNESS			
	The apparatus shall be of positive pressure type so as to prevent ingress of the external atmosphere there should not 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 mass by simply clipping it on the enable wearer to switch on the positive pressure at the last minute		
3.2	Face mask shall cover the eyes, noses, 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 and when the water is peaking.		
3.3	The face mask shall have an inner mask to reduce misting and dead space so that the mask is always remain at center.		
3.4	The face mask shall be secured to the face by mean of an adjustable/replaceable head harness and they shall be fitted with a neck strap to support them when not being worn. There shall be five head harness but 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.		
37	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 stored 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 the position it shall be molded from silicon rubber it should be easily detachable for cleaning and decontamination. There shall be five quick release harness out of which only 4 shall need to be tightening with the 5 th i.e. top one shall be prefixed to ensure quick donning and center placing of the mask while wearing.		
6	BODY HARNESS The body harness shall be designed to allow the user to done the apparatus quickly and easily without assistance and shall be adjustable for fit. Buckles fitted to waist and		

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	shoulder harness shall be so constructed that once adjusted they will not slip.			
7	EXHALATION VALVE The apparatus shall be provided with a unidirectional exhalation valve spring loaded to maintain positive pressure in the face mask. The resistance of the valve should not exceed 6 mill 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 500 ltrs/min at all cylinder pressure above 20 bars. It shall be design to push fit/click on to the mask.			
9	SUPPLIMANTRAY SUPPLY Preferably 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 can not be separated by hand. The entire high pressure tube shall be covered by a medium pressure tube having medium pressure supply for safety reason.			
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 It shall indicate pressure on opening of the cylinder. The range shall be 0-350 bar. It shall be placed that the wearer can easily see the pressure while using the set.			
12.1	The pressure gauge shall have a 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.			
12.2	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 ltr/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 ltr./min the loss of air from the damaged component shall not reduce the normal effective			
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		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 20 Db Sound. Warning whistle next to pressure gauge enable to user to ascertain his whistle and can check the same.			
14		BACK PLATE It is to be made of light weight glass and carbon filled nylon composite back plate and intrinsically flame retardant 100% Kevlar webbing and 3 padded harness. Cylinder band should be made up of 100% Kevlar. The back plate shall be so designed that the use 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 ltr. Cylinder of working pressure 200/207/300 bar can be fitted without any alteration.			
15		PRESSURE REDUCER The apparatus shall be provided with a diaphragm less piston pressure reducer which is capable of reducing pressure from 300 bar to 7 bar (approx.) . the designing shall be such that back pressure development shall be minimum, second inept/outlet shall be provided on the reducer. High pressure and medium pressure safety shall also be provided on the reducer.			
16		COMMUNICATIONS This para has been excluded			
17		ADSU Should be made of solid state technology- infrared motion sensor with no internal contact to wear out.			
17.1		Should be provided with long life lithium magnesium dioxide batteries.			
17.2		Should have loud 112-decibel alarm.			
17.3		GAS CYLINDER AND MAIN VALVE Cylinder used shall be of Carbone composite having 6/6.8 ltr. water Capacities, 300 bar working pressure 1800 ltr. Compressed air for 45/46 minute duration. The cylinder and valve should be approved by chief controller of explosive , Nagpur , India.			
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19		PACKING The breathing apparatus shall be packed in hard bag made of plastic of FRP			

20	MARKING			
	The trade mark of manufacturers identification shall be marked on the face mask, 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 certification of the product offered.			
4	Technical manual comprising of servicing details shall be supplied with system.			
5	Relevant test certificate shall be provided from a govt. approved laboratory or from the manufacturer, along with their offer.			

[Signature]
Asstt. Commandant/Fire
CISF Unit BHEL Jhansi