INVITATION OF EXPRESSION OF INTEREST (EoI) FOR 04 NOs NDRF EQUIPMENT

NDRF is the lead federal force responsible for responding to all types of natural and man-made disasters. NDRF acknowledge the importance of having reliable, CBRN, CSSR & MFR equipment to enhance the efficiency and effectiveness of rescue operations.

2. NDRF now intends to procure CBRN, CSSR & MFR equipment for each of its 16 Units/Academy. Accordingly, NDRF has prepared a draft technical specification for **04** Nos NDRF equipment required to enhance the efficiency and effectiveness of rescue operations. The draft specifications are appended as **Appendix- A**.

3. In this context, NDRF invites Expressions of Interest (EoI) from eligible manufacturers, suppliers and vendors to submit their comments and suggestions. In case these specifications do not match with the available equipment in the market, the same may be highlighted and the specification of the equipment available in the market may kindly be provided with the same functionality. The purpose of the EoI document is to provide necessary information to NDRF so that genuine and generalized specifications can be framed and finalized for further procurement, and no gap exists in the specifications of the items available in the market out the specifications floated in the bid by NDRF.

4. This EOI is not an offer by NDRF or a tender document but it is an invitation to receive responses from eligible manufacturers, suppliers and vendors in the industry the draft specification framed by NDRF.

5. **Eligibility Criteria:** The minimum eligibility criteria for an entity to participate in the EoI is as follows:

i. The entity must be a manufacturer or vendor/supplier/dealer registered in India under relevant applicable Acts and Laws.
ii. The entity must have some experience in the supply of such equipment.
iii. NDRF may call manufacturers, suppliers and vendors to conduct the demonstration/field trial of such equipment if needed before finalizing the specification.

6. **Documents to be submitted:** The following documents are required to be submitted as part of the response to this EoI

i. Documents supporting Eligibility Criteria as mentioned above.
ii. List of equipment/catalog with detailed technical specifications along with estimated cost if possible.

7. Eligible manufacturers, suppliers and vendors who have the competence and experience to carry out such work are requested to submit the EoI along with supporting documents by 06/05/2024.

Important timelines:

Event	Timeline
Last date of submission of responses	06/05/2024

(Harvinder Singh)
Second-In-Command (R&D)
HQ NDRF

No. I-17018/R&D/E-71402/HQ NDRF/2024 - 750 dated: **15/04/2024**

Appendix-'A'

1. Specification of Flexible Stretcher:-

S. No	Specifications	Proposed by the BOO
Source – By M/S Medi Help& Internet		
1.	Flexible, strong and compact rescue stretcher which can be stored in a backpack.	Yes
2.	It can be used to carry, lift, transport the victim in horizontal and vertical position on land, snow, can be hoisted, mines, at altitude, gliding and even capable of being dragged on ground surface if required in an emergency	Yes
3.	Plastic Material, completely foldable with belts and additional handles for towing and lifting of normal to heavy patients.	Yes
4.	Slings with webbing to secure the patient in horizontal or vertical position.	Yes
5.	Transport Bag with padded shoulder straps for stretcher along with its all accessories	Yes
6.	The stretcher with accessories folded and stored should be able to be carried like a backpack by 1 operator.	Yes
Technical Specifications		
1.	Impervious to oil, water, blood, mucous, grease and other petroleum products.	Yes
2.	Resistant to corrosion	Yes
3.	Easy to clean vinyl coated nylon, fire retardant	Yes
4.	Having two pairs of carry handles with an additional handle of rope at each end	Yes
5.	Have provision for footrest to be made for the feet for patient comfort. Have components prearranged to make deployment quicker	Yes
6.	Have a 10 m rope to guide clear tree line or for pulling on ground.	Yes
7.	Capable to carry the patient in the air, on land and snow, Able to drag the stretcher on land even by 1 person.	Yes
8.	Head to toe cover	Yes
Technical Data		
1.	Material	Piastic or Light weight material
2.	Dimensions	900-930 X (2x3.5)x(2400-2480) mm
3.	Weight	5-7 kg
4.	Weight includes belts and transport bog	7-9 kg
5.	Load capacity	170- 220 kg
6.	Number of transport handies	5+4 extre handle removable
7	Total Bag Transport bag	Yes
Certification		
1.	BIS/ CE or any other Equivalent Certification	Yes

2. Specifications of Plastic Suit with Comfy Respirator

1. Material

i. Chemically resistant materials: Polyethylene (PE), polyvinyl chloride (PVC)
ii. Taped seams and joints to prevent liquid ingress.

2. Design

i. Full-body coverage: Hood, torso, arms, and legs.
ii. Elasticized cuffs and ankles for a secure fit.
iii. Reinforced knee, elbow and hips areas for durability.
iv. Crotch gusset for stretch-ability and durability

3. Closure System

i. Front entry with zipper or similar closure, covered by a storm flap.
ii. Adhesive or snap closures.

4. Hood

i. Integrated hood with elastic face opening for a snug fit.
ii. Compatibility with respiratory protection devices.

5. Seams

i. Seams heat-sealed or taped to prevent liquid penetration.
ii. Stitched and bound seams for additional strength.

6. Ventilation

i. Ventilation flaps or systems to prevent heat buildup.

7. Gloves

i. Attached chemical-resistant gloves with tight wrist seals (optional).
ii. Same material as the suit with grip for holding equipment.

8. Size Range

i. Available in various sizes (S to 3XL) to accommodate a range of body types.

9. Durability

i. Tested for abrasion, flex cracking, trapezoidal tear resistance, tensile strength and puncture resistance as per **EN 14325 for type3** (amplification notes in "Annexure 1A")
ii. Suitable for reuse with proper decontamination procedures

4. Face Mask Seal

i. Airtight seal to prevent contaminant ingress.
ii. Adjustable straps for various face shapes.

5. Face Mask Breathing System

i. Appropriate valves and filters for intended use.

6. Face Mask Communication

i. An integrated speech diaphragm for clear communication while wearing the mask. (amplification notes in "Annexure 2B")
ii. Clear communication ports if needed.

7. Face Mask Durability

i. Constructed from durable materials.
ii. Resistant to impact and abrasion.

8. Face Mask Maintenance and Cleaning

i. Easy disassembly for cleaning.
ii. User instructions should be clearly mentioned for the selected disinfectant, including application and contact time.

9. Face Mask Weight

i. Lightweight design (not exceeding 405 gms).

10. Face Mask Compliance and Certification

i. Compliant with safety standards EN 136 class 3 (amplification notes in "Annexure 3A")
ii. Certification from relevant regulatory bodies.

11. Face Mask Accessories

i. Availability of protective covers, carrying cases, and filters.

12. Face Mask User Instructions

i. Clear instructions for donning, doffing, and maintenance.

13. Face Mask Size Range

i. Available in different sizes (S to 3XL)

14. Respirator Type

i. Specifically designed for chemical and vapor/ gas protection as per standards of EN 14387 class 3 (amplification notes in "Annexure 4")

15. Respirator Filter Cartridges

i. Meeting standards of EN 14387(amplification notes in "Annexure 4")

iii. Having shelf life of at least five years

10. Weight

i. Lightweight design for user comfort during extended use.

11. Certification and Compliance

i. Compliance with safety standards **EN 14605 for type3** (amplification notes in "Annexure 2A")
ii. Certification from appropriate regulatory bodies.

12. Chemical Resistance

i. Resistance to a wide range of liquid chemicals as per standards of **EN 14325 for type3** (amplification notes in "Annexure 1A")

13. User Instructions

i. Clear instructions for donning, doffing, and decontamination.
ii. Information on limitations of use and expected service life.

14. Thickness

i. Less than or equal to 0.2mm.

Proposed Amendments In Specifications Of full face mask and respirator

1. Face Mask Material

i. Face Seal: Any certified material which is comfortable and fulfills or exceeds the NIOSH standards.
ii. Visor/Lens: Poly-carbonate or impact-resistant
iii. Head Straps: Adjustable, durable, non-irritating.

2. Face Mask Design

i. Full face coverage: Eyes, nose, and mouth.
ii. Comfortable, ergonomic design.
iii. Wide field of vision, compatibility with eyeglasses.

3. Face Mask Visibility

i. Anti-fog feature
ii. Compatibility with helmet-mounted lights.

16. Respirator Exhalation Valve

i. Exhalation valve for easy breathing.
ii. Design to prevent inward leakage.

17. Respirator User Instructions

i. Clear instructions for use, replacement schedules.

18. Respirator Assigned Protection Factor (APF)

i. Should have APF50 as per OSHA guidelines. (amplification notes in "Annexure 5")

19. Respirator Storage and Transportation

i. Consideration of storage requirements.
ii. Transportation guidelines to prevent damage.

20. Respirator Training

i. Training materials on proper use and care.

21. ESLI (End-of-Service-Life Indicator)

i. Equipped with an ESLI. (amplification notes in "Annexure 6")

Note:- Following Indian standards are also available and can also be used if desirable but these are very generic and not specific and exhaustive.

1. IS 15071:2002 of Indian standards for chemical protection clothing (annexure 1B)
2. IS 14166 : 1994 of Indian standards for respiratory protective devices, full face masks (annexure 2B)
3. IS 8347 : 2008 of Indian standards for respiratory protective devices (annexure 3B)

3. B.A Set with spare cylinder

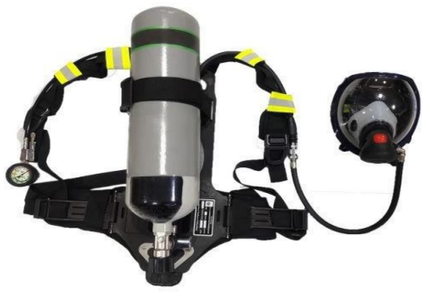
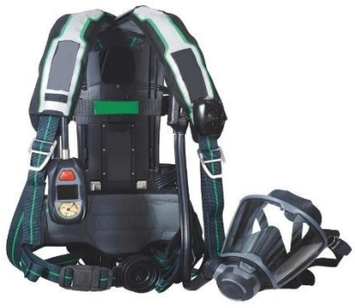
01. **General :-**

A Breathing Set with spare cylinder (or SCBA) is personal protective equipment designed to provide respiratory protection in environments where the air quality is compromised. It is used by rescuers where the presence of hazardous gases, smoke, or lack of oxygen pose a significant threat to human health.

The Breathing Set with spare cylinder (or SCBA) comprises a facepiece, a high-pressure tank containing compressed breathing air, a regulator, and associated components. The facepiece protects from inhalation of harmful substances. The high-pressure tank stores breathable air, and the regulator controls the flow and pressure of the air supplied to the user.

The self-contained, Positive pressure and open circuit air breathing apparatus manufacturer must be holding NIOSH approval under rule 42 CFR 84.83(f) which defines that "Each remaining service-life indicator or warning device must give an alarm when the remaining service life is reduced to a minimum of 25 percent of its rated service time or any higher minimum percent value or values as specified in the approval. Open-circuit demand and pressure demand respirators must alarm continuously until depletion of the breathing air supply. The percent value set for indicator activation must be identified by labels and/or markings on each respirator unit".

02. Existing and review draft specifications of Breathing Set with spare cylinder (or SCBA) :-

S/ No	Existing specification	Review Specification
	 **TECHNICAL SPECIFICATION** **Back Plate and Body Harness**: This shall be made of non - metallic, antistatic, impact, chemical & fire resistant material and orthopaedic ally designed and manufactured in conformity to EN/ DIN/ US/BIS 10245 PART II standards and certified for use by the fire fighters, It shall facilitate mounting of air cylinder through cam lock. The body harness shall be wearer friendly and safe for carrying load while all buckles shall be quick release type. **Pressure reducer**: This shall be so designed so as to meet the air demand for two users simultaneously at a stable pressure on the outlet with inlet pressure varying from 300 bars to 20 bars and shall confirm to provisions in pr EN 137-2002	 **TECHNICAL SPECIFICATION** **Back Plate and Body Harness**: This shall be made of non - metallic, antistatic, impact, chemical & fire resistant material and orthopaedic ally designed and manufactured in conformity to EN/ DIN/ US/BIS 10245 PART II standards and certified for use by the fire fighters, It shall facilitate mounting of air cylinder through cam lock. The body harness shall be wearer friendly and safe for carrying load while all buckles shall be quick release type. **In addition, following state of the art features should have in the harness** (a) Comfortable padding (b) Extremely robust cover fabric to withstand repeatedexposure to flame and heat (NFPA approved) (c) Robust adjustment buckles made from cast

S/ No	Existing specification	Review Specification
	class II. **Face Mask**: The shall be reverted edge seal type and made of flame resistant material confirming to EN 136. The reflex seal on the outer mask shall be so designed so as to facemask to reduce dead space, speech transmitter for clear voice reproduction and a wide angle panoramic vision visor made of Polycarbonate material and shall be self - de- misting type. The head straps shall be easy to tighten and quick to release. **Demand valve**: The lung operated demand valve design shall either be titling diaphragm type or piston type. This shall be provided on the facemask and connected to the pressure reducer with the help of rubber hose through quick connector. The demand valve shall be rated for minimum 500 Lpm airflow and shall activate with the first breath. **Pressure gauge**: This shall be bourdon pressure gauge with luminescent dial with reassure making in bar and encased in fire resistant rubber cover. The gauge shall be connected to pressure reducer through non-metallic rubber hose. **Hoses**: The low pressure hoses shall be flexible and non-kinking type and suitably reinforced to with stand 30 bar air pressure while the high - Pressure hoses shall either be flexible or rigid metallic tube suitably secured to the back plate so as not to obstruct the movement of the wearer. **Warning Whistle**: This shall be fitted either on the back plate or provided along with the pressure gauge assembly and shall be automatic in operation giving audible alarm of minimum 90 dB intensity at 1 meter distance of low cylinder pressure in the range of 50+ 5 Bar. **'Y' manifold for additional connections**: This set shall have provision through suitably placed ' Y' manifold to facilitate receiving air from a different source and supplying air for additional facemask. **Air Cylinder**: This shall be corrosion and impact resistant and made of light alloy fully wrapped. The size of the cylinder shall be such that it can hold sufficient quantity of air [Not less than 1800 litres] for providing 45 minutes total working duration when charged at 300 bars pressure. The cylinder shall be provided with cross flow valve and EN 144+2 compliant. The cylinder shall be duly approved by the Chief Controller Explosive Nagpur and	steel (d) Protection tunnels for lines with reflective features (e) Integrated stand-by support for demand valve **Pressure reducer**: This shall be so designed so as to meet the air demand for two users simultaneously at a stable pressure on the outlet with inlet pressure varying from 300 bars to 20 bars and shall confirm to provisions in pr EN 137-2002 class II. **Face Mask**: The shall be reverted edge seal type and made of flame resistant material confirming to EN 136. The reflex seal on the outer mask shall be so designed so as to facemask to reduce dead space, speech transmitter for clear voice reproduction and a wide angle panoramic vision visor made of Polycarbonate material and shall be self - de- misting type. The head straps shall be easy to tighten and quick to release. **<u>In addition, the following features should be available in Face Mask</u>-** Open port technology for free breathing when instand-by (demand valve not attached) Huge field of vision for unobstructed view Low profile for less snagging and improved weight distribution Independent of electronic options to minimize costsfor individual mask ownership and upkeep All components easily accessable and interchangeable for easy maintenance and cleaning Available in 3 sizes Choice of classic rubber or modern fabric harness **Demand valve**: The lung operated demand valve design shall either be titling diaphragm type or piston type. This shall be provided on the facemask and connected to the pressure reducer with the help of rubber hose through quick connector. The demand valve shall be rated for minimum 500 Lpm airflow and shall activate with the first breath. **<u>Optional Head-Up-Display</u>** LEDs, located in demand valve, display pressure, system and alarm status unobtrusively and without work interruption. Signals delivered through the line to the demand valve and continue to the inside of the mask through light pipes **Pressure gauge with Electronic Signalling and**

S/ No	Existing specification	Review Specification
	shall be capable of withstanding a minimum hydraulic testing pressure of 450 bars. Weight "The weight of the ready to use set shall not be more than 12.5 kgs. 03. **APPROVAL**: The complete set shall have relevant EN or equivalent approval and certificate to this effect shall be furnished along with the offer. 04. **TECHNICAL EVALUATION**:- The technical evaluation of the SCBA shall be subjected to the following:- Meeting the requirement as mentioned from Sl. No. 1 to 3 above. Designed in conformity to EN/NIN/US standards, conformity certificate and CCOE certificate to be submitted along with the offer.	**Warning System (PASS)**: This shall be bourdon pressure gauge with luminescent dial with reassure making in bar and with a fully electronic type signalling and warning unit and encased in fire resistant rubber cover. Analogue pressure gauge should work independently of the digital Alarm Cum Signalling Unit even in case of Digital Unit. The gauge shall be connected to pressure reducer through non-metallic rubber hose. The integrated control unit shall be mounted on the shoulder of the wearer in a way that it is readable to the wearer conveniently. **Hoses**: The low pressure hoses shall be flexible and non-kinking type and suitably reinforced to with stand 30 bar air pressure while the high - Pressure hoses shall either be flexible or rigid metallic tube suitably secured to the back plate so as not to obstruct the movement of the wearer. **Warning Whistle**: This shall be fitted either on the back plate or provided along with the pressure gauge assembly and shall be automatic in operation giving audible alarm of minimum 90 dB intensity at 1 meter distance of low cylinder pressure in the range of 50+ 5 Bar. **'Y' manifold for additional connections**: This set shall have provision through suitably placed ' Y' manifold to facilitate receiving air from a different source and supplying air for additional facemask. In addition it should have Buddy Breather 2nd Connection for the following – Allows connection to fellow firefighter in case of emergency Y-piece connector enables donation of air without breaking recipient's air supply Allows for easy connection to airline system 1.2 m medium pressure line in pouch on hip **Air Cylinder**: This shall be corrosion and impact resistant and made of light alloy fully wrapped. The size of the cylinder shall be such that it can hold sufficient quantity of air [Not less than 1800 litres] for providing 45 minutes total working duration when charged at 300 bars pressure. The cylinder shall be provided with cross flow valve and EN 144+2 compliant. The cylinder shall be duly approved by the Chief Controller Explosive Nagpur and shall be capable of withstanding a minimum hydraulic testing pressure of 450 bars. Weight "The weight of the ready to use set shall not be more than 13.9 kgs. **Optional Voice Projection Speaker** – Integrated microphone picks up voice inside the mask independent of environmental conditions.

S/ No	Existing specification	Review Specification
		High volume and speech intelligibility Improves team and training communication. **<u>It should have a Control Module with the following features –</u>** Combined digital and analog pressure reading with TIC (Thermal imaging Camera) Intuitive interface displays essential information by default allowing the user to concentrate on his job Central Processing Module Should be centrally processing all data on the SCBA:motion detection, data distribution to HUD, control module, voice speaker. Piezo alarm sounders project in all directions Built-in RFID reader to log on with personal tag,team assignment or pairing informationSingle Power Supply All components powered with a single power supply Simplified battery monitoring and exchanging Advanced Hip Belt Features Swivelling to follow body movement Easy to use and robust height adjustment to accommodate different torso lengths 03. **APPROVAL**: The complete set shall have relevant EN or equivalent approval and certificate to this effect shall be furnished along with the offer. 04. **Nominal operating Temperature :-**–30 °C to +60 °C 05. **TECHNICAL EVALUATION**:- The technical evaluation of the SCBA shall be subjected to the following:- Meeting the requirement as mentioned from Sl. No. 1 to 3 above. Designed in conformity to EN/NIN/US standards, conformity certificate and CCOE certificate to be submitted along with the offer.

4. TECHNICAL SPECIFICATIONS OF A-LEVEL SUIT

The list of accessories required for the Level "A" suit ensemble are attached as **Appendix 'A'.** The requirements of breakthrough timings of the suit against some of the general chemicals have been tabulated at **Appendix-'B'**. The detail specifications for the handheld Radio and the Self-contained breathing apparatus (SCBA) have been tabulated at **Appendix-C** and **D** respectively.

SN	QR of Chemical Protection Suit
1	**"One piece fully encapsulating type 1A / level "A" gas tight suit covering both the wearer and the breathing apparatus and providing protection against Gasses, Vapours, Aerosol and Liquid (CWAs and TICs) hazardous chemicals and Biological Warfare Agents."**
2	**The suit must be 100% leak/chemical proof and designed for reusability** **It should be overall suit, designed to enclose the wearer's complete body and SCBA.**
3	The suit should conform to NFPA-1991 Class-1 specifications as per the latest approvals.
4	Head area should be large enough to accommodate SCBA face piece and should be able to allow user to wear a hard cap or firemen's helmet, with a provision to attach communication set.
5	The suit having extra connection for supplementary air through line supply would be preferable. Suit should have Integrated ventilation system through one way valve.
6	The suit to be made up of three layered Polyamide Fabric Tychem or equivalent. The material should be of high visibility fluorescent colour.
7	Zipper should be long, gas tight and fitted to the suit and must enable easy donning and doffing. The zipper should be shrouded by two outer flaps which must be fastened together by means of a Velcro strip when suit is in use.
8	All seems to be hermetically double sealed, both from inside and outside.
9	The gloves to be lined (outer Gloves with inner lining compatible with the suit material, with outer layer of Neoprene / Butyl rubber for extra protection. The gloves to be fitted by means of locking cuff mechanism, 2 Spare Pairs of Gloves should be supplied with each suit.
10	The visor to be double glazed permitting clear undistorted vision that will withstand chemical permeation for the substances listed in the European standard EN464:1994 for more than 480 minutes. The visor should be impact resistant. The visor to provide a wide view of vision.
11	The suit to be supplied with adjustable internal support belt to enable wearers of varying size for comfortable use.
12	The suits should be available in S/M/L/XL size depending on the order.
13	**The suit, including gloves, should be lightweight & comfortable to wear., with a maximum weight of 5 Kg ensuring comfort during wear**
14	Each suit to be supplied in a suitable rigid Box/ case to store it when not in use and should have shelf life of minimum five years.
15	The suit should have more than 8hrs (480 minutes) breakthrough time against the given chemicals as per Appendix-"A".
16	Operation/Maintenance manual to be supplied with each suit with indicative BTT for different chemical environment.

Appendix-'A'

Accessories

1	Each suit should have intrinsically safe, fireproof, hands-free Radio Set / Walkie-Talke (VHF/ UHF) inside the suit for communication during operation.
2	Each suit should have a SCBA with a lightweight carbon steel/ Aluminum cylinder with capacity to allow continuous work for not less than 45 minutes. It should be able to give out alarm 15 minutes prior to exhaustion of air in the cylinder. It should have minimum 15 years' service life and 3 to 5 years hydrostatic testing cycle.
3	Each suit should be provided with chemically resistant boots to be that can be attached with the suit. The boot must also be providing a high degree of protection against mechanical hazards. (Boots with steel toecap and mid sole). The main features of boots to include: a) BTT for chemicals/ gasses/ aerosols not less than that of the suit b) Not less than 200 Joule Steel toe cap. c) Cleated Slip Resistant Sole. d) Stainless steel midsole. e) Injection moulded seamless construction. f) Non-absorbent polyester lining. g) Kick off lug for easy removal. h) Cleated, oil Resistant Rubber outsole for superior grip. i) Exothermic insole for maximum wearer comfort. j) Antistatic properties. **k) Confirming EN-13832-3**

Appendix-B

Chemical	**Breakthrough Time** (Minutes)
Hydrofluoric Acid	>480
Acetone	>480
Acetonitrile	>480
Carbon Disulfide	>480
Dichloromethane	>480
Diethylamine	>480
Dimethylformamide	>480
Ethyl Acetate	>480
n - Hexane	>480
Methyl Alcohol	>480
Nitrobenzene	>480
Sodium Hydroxide	>480
Sulfuric Acid	>480
Tetrachloro ethylene	>480
Tetrahydrofuran	>480
Toluene	>480
GASES	**Breakthrough Time** (Minutes)
Ammonia Gas	>480
1,3 Butadiene Gas	>480
Chlorine Gas	>480
Ethylene Oxide Gas	>480
Hydrogen Chloride Gas	>480
Methyl Chloride Gas	>480
Chemical Agent	**Breakthrough Time** (Minutes)
Bis (2-chloroethyl) sulfide (Mustard:HD)	>480
Isopropyl methyl fluoro phosphonate (Sarin:GB)	>480
Chlorovinyl arsine-di-chloride (Lewisite:L)	>480
0-ethyl S-(2-di-isopropylaminoethyl) methylphosphonothiolate (Nerve: VX)	>480

Appendix-'C'

QRs of DIGITAL CONVENTIONAL RADIO DMR Tier II

A. HANDHELD RADIO

1.	GENERAL		TRIAL DIRECTIVE
1.1	Frequency Range	VHF/UHF (organization may specify)	USER/ DCPW to test
1.2	TDMA	2 - Slot	USER/ DCPW to test
1.3	Channel Capacity	255 or more (set with display) 16 Channels (set without display)	USER/ DCPW to test
1.4	Channel Spacing	12.5KHz	USER/ DCPW to test
1.5	Battery Capacity	Li-ion/Li-Poly rechargeable battery of capacity 2000 mAh or higher capacity. Complying applicable BIS Standard	USER/ DCPW to test
1.6	Average battery duty cycle 5/5/90	Digital : 10 hrs or more Analog: 08 hrs or more	USER/ DCPW to test
1.7	Frequency Stability	±1.5 PPM or better	USER/ DCPW to test
1.8	Antenna Impedance	50 Q	USER/ DCPW to test
1.9	Antenna	Helical Antenna	USER/ DCPW to test
1.10	Weight	Less than 500 gms with battery	USER/ DCPW to test
1.11	EMI/EMC	ETSI EN 301 489 - 1& ETSI 301 489-5/	OEM Certification supported by International Recognized Laboratory.
1.12	Air Interface Standards	Shall be open Standard DMR Tier - II	OEM Certification supported by International Recognized Laboratory.
2	**TRANSMITTER**		
2.1	RF Power Output	VHF - 1 to 5 Watts (programmable) UHF -1 to 4 Watts (Programmable)	USER/ DCPW to test
2.2	FM Emission	11K0F3E, 7K6OFXE, 7K6OFXD, 7K6OFXW	USER/ DCPW to test
2.3	Digital Modulation	4FSK	USER/ DCPW to test
2.4	Modulation Limiting	±2.5KHz@ 12.5 KHz	USER/ DCPW to test
2.5	FM HUM & Noise	-40 dB or better	USER/ DCPW to test
2.6	Adjacent Channel Power	- 6 0 d B c o r b e t t e r	USER/ DCPW to test
2.7	Audio Response	+1,-3dB	USER/ DCPW to test
2.8	Audio Distortion	Less than 3%	USER/ DCPW to test
2.9	Digital Vocoder	AMBE +2	USER/ DCPW to test
2.10	Communication security (Optical)	System should have in built encryption and should also have provision to support 3rd Party Encryption.	USER/ DCPW to test

3	**RECEIVER**		
3.1	Sensitivity (Analog)	0.3011V (12dB SINAD) or better	USER/ DCPW to test
3.2	Sensitivity (digital)	0.30pV at 5% BER or better	USER/ DCPW to test
3.3	Adjacent Chanel Selectivity	60dB or better	USER/ DCPW to test
3.4	Inter- modulation	70dB or better	OEM Certification supported by International Recognized Laboratory.
3.5	Audio Output	Minimum 500mW	User /DCPW to test
4	**ENVIRONMENTAL**		
4.1	Operating Temperature	-30°Cto + 55°C	OEM Certification supported by International Recognized Laboratory
4.2	Storage Temperature	-40°Cto + 70°C	
4.3	Humidity	95%Max. at +40°C non-condensing	
4.4	Vibration	MIL-STD -810 F/G	
4.5	Shock & Drop	MIL-STD -810 F/G	
4.6	Water intrusion & Dust	MIL-STD-810F/G or IP-67	
4.7	Salt	MIL-STD-810F/G	
4.8	Rain	MIL-STD-810F/G	
4.9	Low Pressure	MIL-STD-810F/G	

Feature wise Configuration:

5	**ACCESSORIES**		
5.1	Battery Charger		
5.1.1	Input Voltage	230V±10%, 50Hz	
5.1.2	Output Voltage	As per battery pack (Information will be provided by OEM/ Vendor).	USER/DCPW to test
5.1.3	Type of Battery Charger	Li-ion/Li-Poly	USER/DCPW to test
5.1.4	Protection	l) Reverse polarity protection m) Short circuit protection	USER/DCPW to test
5.1.5	Indication	Visual indication for all mode of charging status	USER/DCPW to test
5.1.6	Charging time	Standard chargers - 6 to 14 Hrs Rapid Charger - 1 to 3 hrs	USER/DCPW to test
5.1.7	No. of charging pocket	1/2/6 (vendor to quote accordingly)	USER/DCPW to test
5.11	Hand free kit (VOX unit with PPT)	The offered sets should be compatible with any one or more of the following variants 1. Bone Conduction 2. Ear Plug 3. Headphone, etc.	USER/DCPW to test
5.12	Programming Kit	All necessary software and Hardware required for programming of the sets independently for lifelong support with regular updates.	USER/DCPW to test

5.13	Literature	(a) User manual with each radio sets should be provided free of cost in soft as well as hard copy. (b) Technical repairing & maintenance manual, with complete block diagram, circuit layout, PCB layout, component & wiring diagram etc. should be provided as per user's requirement in soft as well as hard copy.	
5.14	No. of Battery	Two lithium- Ion or Li-polymer batteries with each radio set.	USER/ DCPW to test
5.15	Case	One good quality case with belt clip & shoulder strap to house the radio sets on operation.	USER/ DCPW to test
6	**Configuration VH 1 (Without display)**		
6.1	Simple press to talk		USER/ DCPW to test
6.2	Low battery alert		USER/ DCPW to test
6.3	Continuous tone coded squelch system (CTCSS)		USER/ DCPW to test
6.4	Mixed Mode Operation (analogue and digital)		USER/ DCPW to test
7	**Configuration VH 2 (With**	**display)**	
7.1	All feature of configuration VH1		USER/ DCPW to test
7.2	Any one of 2 -Tone/5-Tone/DTMF signalling.		USER/ DCPW to test
7.3	Busy Channel Lockout.		USER/ DCPW to test
7.4	Selective call Decode/ Encode.		USER/ DCPW to test
4.5	Capable of VOX hand free operation.		USER/ DCPW to test
7.6	PPT ID Encode.		USER/ DCPW to test
7.7	Chanel Scanning with call quieting facility.		USER/ DCPW to test
7.8	Emergency SOS/SIREN		USER/ DCPW to test
7.9	Talk around Mode		USER/ DCPW to test
7.10	Automatic Number Identification (ANI)		USER/ DCPW to test
7.11	Text message and predefined message (Optical with keypad)		USER/ DCPW to test

8	**Configuration VH3 (with GPS)-**		
8.1	All feature of configuration of VH2.		USER/ DCPW to test
8.2	Should have built - in GPS feature with following specification:		USER/ DCPW to test
		i. Time to First Fix (TTFF) cold start : < 2 minutes ii. Time to First Fix (TTFF) hot start : < 20 seconds Horizontally accuracy : < 10 meters	USER/ DCPW to test

The VHF/ UHF sets to be provided with the suits should have configuration VH3 (with GPS) Since the sets are to be used in an environment containing chemicals which may contain combustible compounds, they should be intrinsically safe to preclude any possibility of triggering an explosion/ combustion.

Appendix-'D'

SELF CONTAINED BREATHING APPARATUS SET WITH SPARE CYLINDER

1. GENERAL:

The self-contained, Positive pressure and open circuit air breathing apparatus shall be certified for use by the fire fighters for 45 minutes total working duration.

2. TECHNICAL SPECIFICATION:

a. **Back Plate and Body Harness:** This shall be made of non - metallic, antistatic, impact, chemical & fire resistant material.

b. Designed and manufactured in conformity to EN/ DIN/ US/BIS 10245 standards and certified for use by the fire fighters, it should facilitate mounting of air cylinder through cam lock. The body harness shall be wearer friendly and safe for carrying load while all buckles shall be quick release type

c. **Pressure reducer:** This shall be so designed so as to meet the air demand for two users simultaneously at a stable pressure on the outlet with inlet pressure varying from 300 bars to 20 bars and shall conform to provisions in pr EN 137-2002 class II.

d. **Face Mask:** It should be reverted edge seal type and made of flame resistant material conforming to EN 136. The reflex seal on the outer mask shall be so designed as to reduce dead space, Facemask should have speech transmitter for clear voice reproduction and a wide angle panoramic vision visor made of Polycarbonate material which shall be self - de- misting type. The head straps shall be easy to tighten and quick to release.

e. **Demand valve:** The lung operated demand valve design shall either be tilting diaphragm type or piston type. This shall be provided on the facemask and connected to the pressure reducer with the help of rubber hose through quick connector. The demand valve shall be rated for minimum 500 LPM airflow and shall activate with the first breath.

f. **Pressure gauge:** There shall be bourdon pressure gauge with luminescent dial with reassure making in bar and encased in fire resistant rubber cover. The gauge shall be connected to pressure reducer through non-metallic rubber hose.

g. **Hoses:** The low pressure hoses shall be flexible and non-kinking type and suitably reinforced to withstand 30 bar air pressure while the high - Pressure hoses shall either be flexible or rigid metallic tube suitably secured to the back plate so as not to obstruct the movement of the wearer.

h. **Warning Whistle:** This shall be fitted either on the back plate or provided along with the pressure gauge assembly and shall be automatic in operation giving audible alarm of minimum 90 dB intensity at 1 meter distance of low cylinder pressure in the range of 50+ 5 Bar.

i. **'Y' manifold for additional connections:** This set shall have provision through suitably placed ' Y' manifold to facilitate receiving air from a different source and supplying air for additional facemask.

j. **Air Cylinder:** This shall be corrosion and impact resistant and made of fully wrapped light alloy. The size of the cylinder shall be such that it can hold sufficient quantity of air [Not less than 1800 liters] for providing 45 minutes total working duration when charged at 300 bars pressure. The cylinder shall be provided with cross flow valve and should be EN 144+2 compliant. The cylinder shall be duly approved by the Chief Controller Explosive Nagpur and shall be capable of withstanding a minimum hydraulic testing pressure of 450 bars.

k. **Weight** "The weight of the ready to use set shall not be m re than 12.5 k

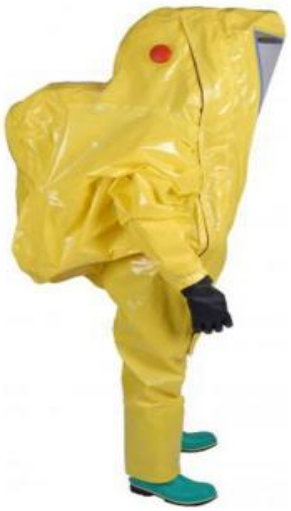
3. APPROVAL: The complete set shall have relevant EN or equivalent approval and certificate to this effect shall be furnished along with the offer.

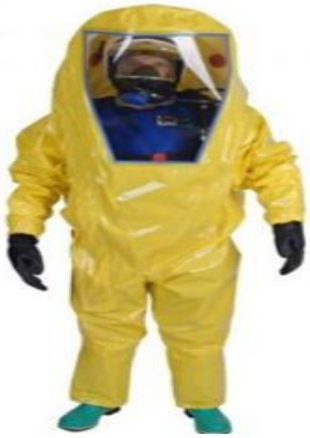
TECHNICAL EVALUATION:-

The technical evaluation of the SCBA shall be subjected to the following:-

a) Meeting the requirement as mentioned from Sl. No. 1 to 3 above.

b) Designed in conformity to EN/NIN/US standards, conformity certificate and CCOE certificate to be submitted along with the offer.





A Level Suit