

भारत सरकार
अंतरिक्ष विभाग (अं.वि.)
समानव अंतरिक्ष उड़ान केंद्र
बेंगलुरु - 56009
क्रय एवं भंडार



GOVERNMENT OF INDIA
DEPARTMENT OF SPACE (DOS)
HUMAN SPACE FLIGHT CENTRE
BENGALURU-560094
PURCHASE & STORES
Ph No. 080-23415474 Fax. +91-8623-225170
e-mail :hps-hsfc@isro.gov.in

निविदा आमंत्रण
INVITATION TO TENDER

मैसर्स
M/s

00000

हमारी संदर्भ सं

Our Ref. No.. HSMN 2019-000458-01

निविदा अंतिम तिथि

Tender Due at 10:00 hrs IST on 11/09/2019

महोदय

Dear Sirs,

कृपया निम्नलिखित मदों की आपूर्ति के लिए अनुलग्नक (फार्म सं. संलग्न) में उल्लिखित निबंधन एवं शर्तों के अनुसार संलग्न निविदा प्रपत्र में वर्णनात्मक सूचीपत्र/पैम्फलेट/साहित्य सहित हमारी संदर्भ सं. एवं अंतिम तिथि (मोटे अक्षरों में) ऊपर लिखते हुए अपनी मुहरबंद निविदा प्रस्तुत करें।

Please submit your sealed quotation, in the Tender Form enclosed here along with the descriptive catalogues /pamphlets /literature, superscribed with Our Ref.No. and Due Date for the supply of the following items as per the terms & conditions mentioned in Annexure(Form No. null)

क्र.सं. Sl. No.	विनिर्देशों सहित मद का विवरण Description of items with Specifications	इकाई Unit	मात्रा Quantity
1	Development, realization, testing, algorithm development, controller and associated electronics, assembly, supply and commissioning of integrated cabin pressure control system (in full) based on inputs and requirement provided by ISRO.	set	1

सुपुर्दगी स्थल

Delivery At HSFC Bangalore

प्रेषण की विधि

Mode of Despatch BY ROAD

शुल्क छूट

Duty Exemptions GST/CD CONCESSION

विशेष अनुदेश

Special Instructions NIL

विशेष निबंधन

Specific Terms

निविदाकारों को अनुदेश

Instructions to Tenderers

- (1) DETAILED SPECIFICATIONS AS PER ATTACHED ANEXXURE
- (2) TENDER NUMBER AND DUE DATE OF THE TENDER SHALL BE MENTIONED ON THE TOP OF THE COVER.
- (3) PLEASE FILL THE COMPLIANCE STATEMENT AS PROVIDED IN THE TENDER ENQUIRY
- (4) QUOTATION DULY STAMPED AND SIGNED SHALL BE SUBMITTED ONLY BY POST OR BYHAND IN SEALED COVER ON OR BEFORE DUE DATE AND TIME(.) QUOTATION RECEIVED BY FAX OR EMAIL SHALL NOT BE CONSIDERED AS VALID OFFER AND WILL NOT BE ACCEPTED FOR EVALUATION
- (5) PLEASE SEND YOUR OFFER TO THE FOLLOWING ADDRESS(.) PURCHASE & STORES OFFICER,HUMAN SPACE FLIGHT CENTRE, DEPARTMENT OF SPACE, ISRO HQ, NEW BEL ROAD, BENGALURU -560094
- (6) THIS IS A TWO PART TENDER(.) PLEASE REFER INSTRUCTIONS

वीणा जी. पी. / Veena G.P.

क्रय एवं भंडार अधिकारी / Purchase & Stores Officer

Government of India
Department of Space
HUMAN SPACE FLIGHT CENTRE (ISRO)
ISRO HEADQUARTERS,
NEW BEL ROAD, BENGALURU – 560 094
Telephone : +91-80 – 2217 2670/71/64
Email: hps0-hsfc@isro.gov.in



Tender Notice No. HSFC/ PT/08/2019-20 Date: 20.08.2019

For and on behalf of the President of India, Sr. Head, Purchase & Stores, Human Space Flight Centre, Bengaluru invites sealed tenders for the following:-

Sl. No.	Tender Number	Brief Description	Due date and time	Tender opening date and time
1.	HSMN 2019000458	Integrated Cabin Pressure Control System – 1 Set.	11.09.2019 10:00 hrs	11.09.2019 15.00 hrs

Tender documents can be bought from the Purchase Division, HSFC and are also available on ISRO website www.isro.gov.in. Interested tenderers may download the same from the website and submit their offer along with Tender fee of Rs. 590/- each (In the form of Crossed Demand Draft). While submitting your offer superscribe Tender No., and due date on the envelope.

If the documents are requisitioned by post, the following points shall be noted:

- 1) Request letter shall be sent for requisitioning tender documents indicating tender notice number and tender number together with tender fee Rs. 590/- each (In the form of Crossed Demand Draft issued by any Nationalized Bank) to the Purchase and Stores Officer, Human Space Flight Centre, Bengaluru – 560 094 only.
- 2) The Envelope containing such request shall be super-scribed with 'REQUEST FOR TENDER DOCUMENTS'. Separate request letter and separate Demand Draft shall be sent for each tender document.
- 3) The tender fees (non refundable) shall be paid in the form of CROSSED DEMAND DRAFT (MICR DD ONLY) payable at BENGALURU in favor of The ACCOUNTS OFFICER, HSFC, Bengaluru – 560 094 only.
- 4) Vendor name & tender number shall be indicated on the reverse side of the DD.
- 5) Govt. Dept, PSUs (both Central & State) and SSI Units included in the list of NSIC. Vendors registered as MSEs and registered with KVIC are also eligible for free tender documents
- 6) No request for extension of the due date will be considered.
- 7) The sale of the tender documents through POST shall be closed 10 days prior to due date.
- 8) In case vendors desire to collect the tender document in person, they may contact Purchase Division, HSFC Building (Extension 2671/70/64) on any working day between 1400 to 1600 hrs up to one day before the due date.
- 9) Deadline for the receipt of the sealed offers shall be up to 10:00 hrs. on the due date mentioned against individual tender.
- 10) Bids received before the deadline shall be opened in the presence of attending tenderers/their authorized representatives on the same day at 15.30 hrs.
- 11) In the event any date indicated above is declared as holiday, the next working day at HSFC shall be considered as the due date for receiving & opening of tenders.
- 12) Late/Delayed offers will not be accepted.
- 13) Parties, who have submitted bids in time and want to participate in Tender opening, may inform their authorized representative's name one day in advance of the due date indicated against the particular tender. Delayed requests / requests for entry at eleventh hour will not be entertained.

Sd/-

(SR.HEAD, PURCHASE & STORES)

Instructions for Two Part Tender

We are proposing to invite tenders in two parts viz.

- Part I : Technical and Commercial
- Part II: Price

All tenderers are requested to carefully follow the following instructions before preparing their offer.

1) Part I: Technical & Commercial Bid

Part – (a) Technical

1. This part should contain detailed specifications of the items quoted by you along with technical literature and leaflets if any.
2. A compliance statement showing the compliance of the item quoted by you with that of item tendered by us should be prepared and enclosed to this.
3. Any other information called for in the tender related technical and specifications can also come in this part.
4. Prices should not be indicated in this cover.

Part – (b) Commercial Terms: (Without Prices)

1. The commercial terms applicable for the item quoted by you should be indicated in this part.
2. If any compliance statement is called for the commercial terms / contractual terms and conditions, the same is to be attached in this part.
3. Prices should not be indicated in this part. However a copy of the price bid (without prices) can be enclosed in this part to enable to understand whether all the items required to be quoted by you have been quoted in the price bid. Alternatively a statement is to be made indicating that you have quoted prices for all the items as per the tender and enclosed in the Price Bid as per the format.
4. The Commercial terms such as delivery terms, delivery period, payment terms, Warranty, validity of the offer, installation & commissioning, duties and taxes etc., shall come into this.

Notes:

1. Either Technical Specifications or terms & conditions as above should be very clearly reflected item-wise with reference to the items called for in the tender.
2. Please note that the **PRICE SHOULD NOT BE** indicated in this part.
3. Technical and Commercial part as described above shall be prepared and put it in a sealed cover & super scribed and addressed as follows:

Tender No.	:	
Due Date	:	
PART I	:	Technical & Commercial Bid
		The Sr. Head Purchase & Stores Human Space Flight Centre ISRO Headquarters NEW BEL Road, Bengaluru -560094
From:		

2) Part II: Price Bid

1. The prices applicable for the items, item-wise in response to the tender shall come into this part.
2. Tenderer shall indicate very clearly item-wise prices with reference to their technical offer.
3. Price part prepared as above shall be enveloped and superscribed as follows:

Tender No. :	
Due Date :	
PART II :	Price Bid
	The Sr. Head Purchase & Stores Human Space Flight Centre ISRO Headquarters NEW BEL Road, Bengaluru -560094
From :	

3) The Technical & Commercial envelope (Part I) and Price cover (Part II) prepared as above along with 'Tender fee cover' (if applicable) should be inserted in another envelope and superscribed as follows:

Tender No. :	
Due Date :	
	Part I & Part II are individually sealed and kept inside: (DD towards tender fee also is kept inside)
	The Head Purchase & Stores Human Space Flight Centre ISRO Headquarters NEW BEL Road, Bengaluru -560094
From:	

Important Notes:

1. Being a Two-Part Tender, fax/mail quotations will not be accepted. Please ensure your offers are received by post before due date and time.
2. In case you are going to download the documents from our website and submitting the offer, you are requested to submit the demand draft towards Tender fee in a separate cover along with a covering letter duly superscribing on the cover "Tender fee in respect of Tender No. _____". Earnest Money Deposit have to be submitted alongwith Techno Commercial offer in a Separate Cover.

Cabin Pressure Control System

(Two Part Tender)

Description	Qty	Rate (Rs)	Amount (Rs)
Development, realization, testing, algorithm development, controller and associated electronics, assembly, supply and commissioning of integrated cabin pressure control system (in full) based on inputs and requirement provided by ISRO.	1 Set		
Unit cost for supply and commissioning of integrated cabin pressure control system (Without development cost)	1 - 4 slab 5 - 8 slab	To be provided by party	To be provided by party
Technical specification & Scope of work - Annexure I			
General terms & conditions, Instruction for Two part tender – Annexure II			
Compliance matrix – Annexure III			
GST 18% extra, Transportation 3% extra			
Development task includes component level selection, developmental and qualification testing. No FIM will be supplied by ISRO.			
Pyrotechnic components will be the responsibility of HSFC.			

Cabin Pressure Control System

1. Introduction

The cabin pressure control system (CPCS) is a sub system of environment control and life support system. The main function of CPCS is to monitor and control the total pressure of cabin and partial pressure of O₂ within the specified limits for a cabin volume of 8m³ and to supply pure O₂ to flight suit in case of emergency. CPCS also provides O₂ + N₂ mixture (30:70) from a stored tank for one time re-pressurising of the cabin in case of fire or major decontamination of cabin leading to emergency de-pressurisation. The CPCS system is to be designed for two fault tolerance in all aspects.

2. Scope of Work:

The Scope of work is to develop, realise, test, assemble, supply and commission the engineering model of Cabin Pressure Control System (CPCS) and demonstrate the working of CPCS in closed loop mode using O₂ compatible components (in full). No part order is acceptable.

The scope involves following specific task:

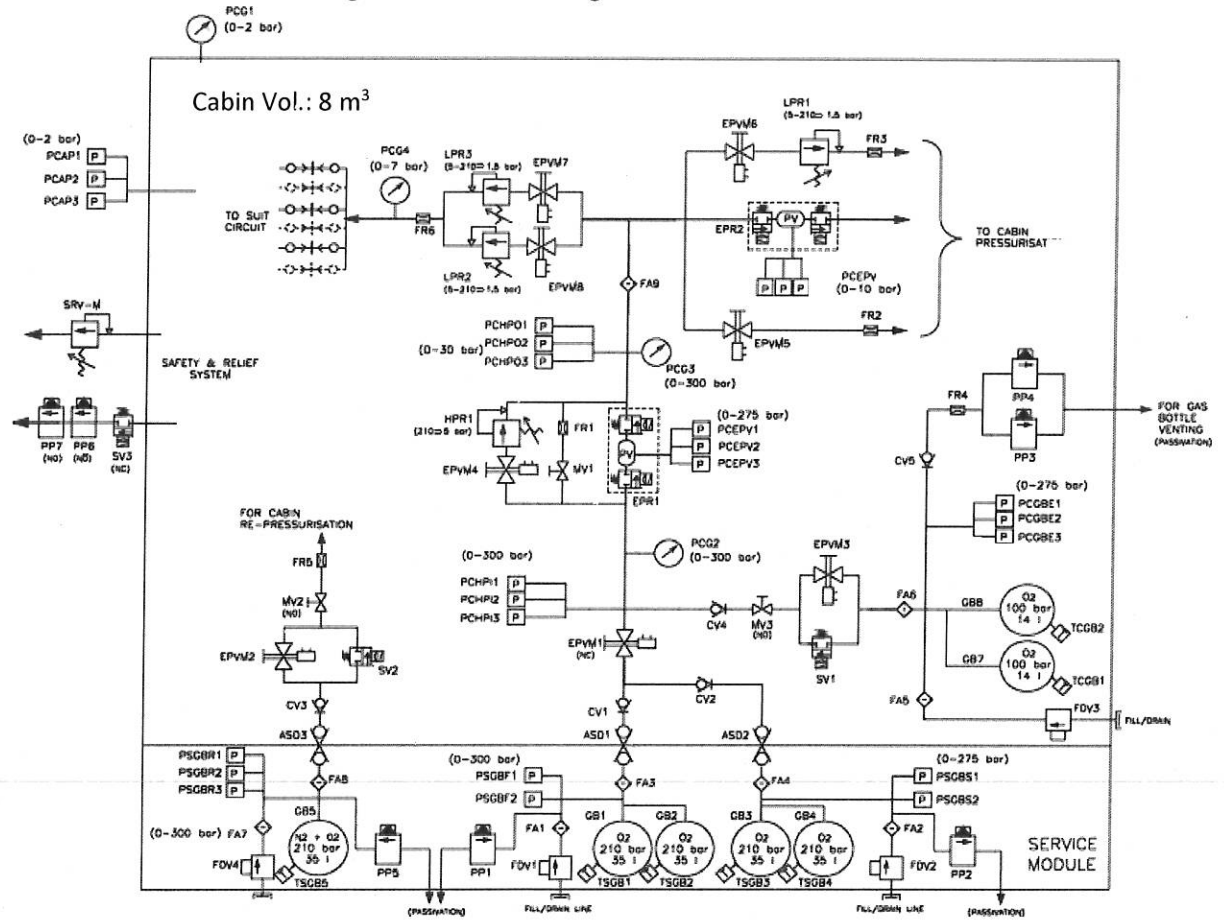
- a) System engineering of CPCS.
- b) Sizing and selection of **O₂ compatible components** (Oxygen compatible gas bottles, absolute pressure regulators, electronic pressure regulator, fill and drain valve, passivation system, venting system, filter assembly, automatic sealing device, check valves, solenoid latch valve (redundant coil) with manual override, solenoid latch valves (redundant coil), high pressure manual valves, flow restrictors, vent valve, positive pressure relief valve, negative pressure relief valve, cabin fans for circulation and all other components which is not explicitly mentioned here and required for the functioning and demonstration of the system).
- c) Development task includes component level selection, developmental and qualification testing as per man rating requirement specified by HSFC. No FIM will be supplied by HSFC / ISRO. Pyro valves are outside the scope of the RFP.
- d) Proper routing, accommodation of component and layout finalization based on inputs from HSFC / ISRO.
- e) Identify, procure and characterise all the raw materials, bought out items, sensors/gauges (sensors can be of industrial grade of reputed brand and

- heritage) etc. required for individual components of CPCS. Mechanical components shall be aerospace grade.
- f) Testing and evaluation of individual components. Party shall indicate the testing facilities available with them in technical proposal.
 - g) Fully instrumented system with TMR redundancy shall be planned to monitor the system health, status of components, cabin parameters like cabin pressure, suit pressure, partial pressure of oxygen, tank pressure temperature, valve status etc.
 - h) Development of control algorithm considering TMR logic for sensors for following conditions:
 - a. Normal functioning of CPCS.
 - b. Failure cases
 - i. Component failure
 - ii. Any leak anywhere.
 - c. Sensors error detection
 - d. Manual override etc.
 - e. Maintaining cabin pressure within range and admitting pure O₂ to flight suit during emergency.
 - i) Display system with health, parameters monitoring, and failure alarm etc. for all components / elements. False alarms shall be prevented.
 - j) Final assembly and integration of entire system.
 - k) Delivery of qualified Integrated CPCS systems, erection and commissioning (demonstration of its functioning in closed loop, performance verification for different cabin pressure and leakages) of system at HSFC or other ISRO centre in and around Bangalore in 6 months.

Party must provide point by point compliance to scope of work and bid evaluation matrix.

3. System Configuration:

The tentative circuit diagram for CPCS is given below:



CPCS is consists of following sub-systems:

- Gas storage (GB)
- High pressure regulation module
- Cabin pressure regulation module
- Suit pressure regulation module
- Electronic pressure regulator consists of 2 solenoid valve (SV) and one Plenum volume(PV)
- Passivation module for emergency gas bottle
- Re-pressurization module
- Venting system
- Safety & relief system
- Sensors
- Controller algorithm

4. Component list for CPCS (O₂ compatible):

Sl. No.	Components	Requirement	Qty
Gas Bottle (Inconel/Monel lining with CFRP wrapping)			
1.	Gas bottle – Primary O ₂ storage (GB1-4)	35 litre tank at 21 MPa	4
2.	Gas bottle – O ₂ /N ₂ mixture for cabin re-pressurization (GB5)	35 litre tank at 21 MPa	1
3.	Gas bottle – Secondary O ₂ storage (emergency) (GB 6-7)	14 litre tank at 20 MPa	2
Manual / Pneumatic operated component (O₂ compatible)			
4.	Fill and drain valve (FDV 1-4)	To fill gas bottles at ground and drain the gas bottle during refurbishing.	4
5.	Filter assembly (FA 1-9)	To filter the O ₂ /N ₂ gas at high pressure side	9
6.	Automatic sealing device (ASD 1-3)	Feed through connector between SM & CM. Sealing devices between SM & CM after separation.	3
7.	Check valves (CV 1-5)	Directional flow control valve	5
8.	High pressure manual valves (MV 1-3)	To isolate pressure up to 25 MPa	3
9.	High pressure regulator (HPR)	Primary pressure reducer from the gas bottle (mechanical). inlet 250-30bar, outlet 5bar	1
10.	Low pressure regulator (Cabin pressure regulator (LPR1), Suit pressure regulator (LPR 2-3))	Final pressure reducer to the required value (mechanical) inlet 250-30bar, outlet 1.5bar	3
11.	Flow restrictor (FR 1-6)	Flow control orifice for tuning the flow	6
12.	Safety relief valve with manual override (SRV 1)	To protect the cabin from over pressurization. Also admit air from outside to inside at set pressure value.	1
13.	Vent Pyro Valve (NC) (PP 1-5)	Not in scope	5
14.	Vent Pyro Valve (NO) (PP 6-7)	Not in scope	2
15.	Electronic pressure regulator (EPR)	One plenum volume (PV) and two solenoid valve (SV)	2
Electrically actuated components (O₂ compatible)			
16.	Electro Pneumatic Valve with manual override (EPVM 1-8)	Isolate the high pressure gas (25 MPa) and to open/close in electric/manual command	8

17.	Isolation / EPR Solenoid valves (SV 1-2)	To isolate the high pressure gas (25 MPa) and to open/close with electric command	2
18.	Vent solenoid valves (SV 3)	For emergency cabin vent operation.	1
Sensors			
19.	High pressure transducer	Range 0 – 27.5 MPa	15
20.	Low pressure transducer	Range 0 – 0.2 MPa	3
21.	Low pressure transducer	Range 0 – 3 MPa	9
22.	Low pressure gauge	Range 0 – 0.2, 0-0.7 MPa	2
23.	High pressure gauge	Range 0-30 MPa	2
24.	Temperature sensors	Range 13-573 K	7

All Mechanical components in system shall be tested to aerospace grade and O2 compatible at specified pressure.

All EEE components shall be of industrial grade from reputed brands (Siemens, Honeywell or equivalent) only.

5. Design Input:

Cabin pressure Control System to be designed with as two-fault tolerant system. MEOP oxygen tank (Made up of Carbon Overwrapped Inconel / Monel) shall be limited to 250 bar. The natural frequency constraints of the fluid systems plumbing shall be met i.e. >100 Hz at the integrated level.

Cabin Specification:

- Cabin habitable volume : 6.0 m³
- Cabin total gas volume : 8.0 m³
- Cabin temperature : 23 ± 3 °C
- Relative Humidity : 30-70 %
- Nominal cabin pressure : 101 kPa (98-116 kPa) TBD
- Nominal O₂ partial pressure : 19-23 kPa
- Re-pressurization total pressure : 70 kPa
- Allowable cabin external leakage : ≤ 100 g/day

Suit Specification:

- Empty volume of suit : 70-90 litres
- Suit clearance volume with crew : 20 litres

- O₂ flow rate (emergency mode) : 20-22 l/min
- O₂ pressure (emergency mode) : 40 kPa
- Suit air temperature : 23 ± 3 °C

Human requirement and effluent data:

- No of crews : 3
- Mission duration : 7 + 2 days
- O₂ consumption/person/day : 0.84 kg (nominal)
: 1.1 kg (maximum)
- Suit O₂ supply for emergency situation : 20 lpm

6. Functional requirements

The major functional requirements of the cabin pressure control system are listed below-

6.1. Control atmosphere total pressure

The total atmospheric pressure in the crew cabin shall be maintained between 98-116 kPa (TBD). The system shall compensate for the allowable leak rates of the cabin and maintain total pressure with oxygen supplementation.

6.2. Control oxygen partial pressure

The atmospheric oxygen partial pressure in the cabin shall be maintained between 19 - 23 kPa. There must be free oxygen at sufficient partial pressure for adequate respiration. Oxygen partial pressure just not be so great as to induce oxygen toxicity and fire hazards.

6.3. Add Oxygen to atmosphere

Gaseous oxygen shall be added to the cabin atmosphere as needed for the breathing.

6.4. Control uniformity of atmospheric composition

Sufficient circulation (0.2 to 0.8m/s) in the cabin volume shall be ensured so that there is no pocket of oxygen concentration in the CM.

6.5. Prevent over-pressurization and/or under-pressurization

The internal-to-external differential pressure in cabin shall not exceed 1.3 bar under static or dynamic pressures.

6.6. Respond to emergencies

The cabin can be intentionally de-pressurised for cleaning up after (in case of a fire) for removing the smoke and other gases. The cabin is to be re-

pressurised to a lower pressure of 70 kPa. Gaseous mixture of nitrogen and oxygen shall be added to the cabin as needed to restore the atmosphere (one time) after depressurization. For this purpose, a separate tank containing O₂-N₂ mixture (30% O₂+70% N₂) is provided. Depressurisation & Re-pressurization shall be carried out within 2 minutes and 5 minutes respectively. In case of emergency, gaseous oxygen shall be supplied to the suit.

6.7. Air supply for suit circuit system

The system shall provide ventilation and breathable air from the cabin to the suit in opened condition and pure oxygen at 40kPa in closed condition for suite mode operation. It shall provide breathable air from cabin to suit @180 to 200 lpm, under normal ventilation mode (to remove heat & sweat) through a distribution unit.

Crew module Shall have oxygen storage to support the crew habitat and supply to flight suit of crew after SM separation till recovery from sea. Also it shall supply pure oxygen @20lpm and at pressure of 40 kPa max. to flight suit under emergency conditions (visor closed). The time duration for emergency condition can be 50 minutes.

6.8. Passivation, Pressure equalization and Post Landing Ventilation

- a) Oxygen tanks shall be passivated. Crew module oxygen tank pressure shall be reduced to \approx 10bar before landing (TBD).
- c) Cabin pressure equalization sequence shall for giving altitude and time required for pressure equalization shall be implemented as provided by HSFC.
- d) Cabin pressure equalization shall be provided in case of over pressurization / depressurization and shall be closed before touchdown to prevent water entry.
- e) Post landing ventilation shall be provided to the cabin after touchdown. Location for the ventilation valves shall be away from crew module formed end to prevent water entry.

7. Realization Plan

- a) Party shall make a detailed document for the preliminary design (selection, sizing, parametric study by perturbing various parameter, EEE components) and get it reviewed by HSFC experts at Bangalore before fabrication and procurement of bought out items.

- b) Party shall make a detailed qualification plan and critical design document and get it reviewed and approved by HSFC.
- c) Preparation of detailed drawing, showing the configuration of individual elements, drawing, sketches, 3-D model etc. shall clearly represent the configuration and construction details of all element clearly and shall be submitted to HSFC for review and approval. Party shall be willing to accept and implement the modification / suggestion by HSFC.
- d) All material used shall be pure O2 compatible and shall be tested to man rating requirements provided by HSFC.
- e) Selected component list shall be shared with HSFC before procurement.
- f) All necessary safety features shall be implemented in the controller such as immediate abort mode, immediate shutdown etc.
- g) Qualification plan shall be brought out with details by the party and same shall be agreed upon by ISRO. Party shall be willing to offer component / process inspection by HSFC as and when asked for.
- h) Generation of detailed log books and process document mentioning each steps of process adopted to realise the component/system.
- i) Traceability of all process/component shall be maintained (detail documentation) during the entire stage and shall be provided for inspection and verification by HSFC.
- j) Detailed operation manual for the facility shall be generated.
- k) Party shall able to complete the work within 6 months from the date of placing the purchase order.

8. Technical requirements:

- a) Party shall size, fabricate and commission the facility as per inputs provided in this document at HSFC, Bangalore.
- b) All the material selected shall meet the flammability, off-gassing, and compatibility requirements mentioned in NASA-STD-(I)-6001A.
- c) Electrical insulation materials also shall be evaluated for arc tracking.
- d) Safety in handling high pressure pure oxygen shall be addressed in the design.
- e) Cleaning procedures for gas tanks and plumbing lines are to be evolved
- f) All oxygen lines and tanks shall be protected from thermal, ionizing and meteorite impact hazards.

- g) Safe Oxygen flow velocity shall be limited within 10m/s and the sizing of the tubes shall be done accordingly. In any Place, where fluid velocities approach 30 m/s (100 ft/s) should be reviewed for particle impact ignition sensitivity
- h) Oxygen tank shall be passivated to avoid any explosion.
- i) Modular approach of regulation modules / components shall be followed where ever possible for independent installation/ testing at subsystem level.
- j) System which requires manual intervention in case of emergency shall be ergonomically positioned
- k) Mechanical joints shall be welded construction, wherever possible.
- l) Materials & seals shall be compatible for high pressure pure oxygen lines
- m) Forced circulation of 0.2m/s to 0.8m/s shall be ensured in the cabin.
- n) Cleanliness Requirements
- i. Filters shall ensure particulates ($>0.5\mu\text{m}$) shall be $\leq 3,500,000$ particles/m³ [NASA-STD-3000].
 - ii. Micro-organisms, shall be less than ≤ 500 CFU/m³(colony forming unit) [NASA- STD-3000] inside the cabin
- o) Noise of should not exceed 85 dBA level.
- p) Mechanical Process / components opted shall be aerospace grade. If not available commercial component can be used after extensively testing (vibration, acoustic, thermal, vacuum, thermo-vacuum, EMI/EMC, shock and endurance testing) of the component as per requirements given by HSFC.
- q) The service life/cycles requirement of the components used shall be defined and certificate for all the components shall be provided.
- r) Location of the pressure equalisation port shall be protected against inadvertent operations
- s) All the failure modes of components / modules including the software algorithms shall be identified and addressed
- t) Controller
- Automated system with one processor for CPCS control and commanding the system, based on input sensor information and act based on the pre-programmed logic/algorithm for the system.
- Closed loop control of the system for various operating conditions by changing the control parameter condition as specified by HSFC during design review.
 - Provide real time display/warnings about critical parameters.

- Automated failure detection and corrective measures.
- Provision for override/manual operation.

Controller shall be based on commonly available processors for easy programming and debugging. Programming systems for the controller also to be provided along with the system for re-programming if required.

- u) Data acquisition and control system shall be provided along with proper software to monitor and control the system parameters in closed loop for different operating conditions.
- v) Detailed failure modes and their criticality (FMECA), Hazard and Operability Study (HAZOP) shall be brought out.
- w) Mil grade components are preferred. However, depending All avionics related items (DAQ, control & sensors) can be of industrial grade.
- x) Electrical supply: varying from 28-42 dc.
- y) Redundancy in coils preferred for electrical motor, valves etc. wherever possible.
- z) Necessary sensors (Triple Modular Redundancy) is required for operating system for various operating condition.
- aa) Powering scheme for redundancy and management of all the hardware unit shall be clearly brought out.
- bb) Algorithm shall be developed and implemented in the controller for closed loop operations.
- cc) Display system with health, parameters monitoring, and failure alarm etc. for all components/elements.

9. Test Requirement (For mechanical components only):

Cabin pressure control system shall be verified for component design and salient features through a series of qualification and acceptance tests for component as well as system level.

9.1 Qualification test at component level:

Component level qualification for nominal conditions & off – nominal conditions shall be demonstrated by the party.

9.1.1 Functional test

The functionality of the system shall be demonstrated through tests. Repeated operation of system at different load conditions shall also be demonstrated. Burst test also shall be demonstrated for critical components.

9.1.2 Leak test:

Leak test with suitable pressure differential shall be planned to qualify the joints.

9.1.3 Flow Characteristic test:

The flow characteristic test shall be performed to evaluate the pressure drop across component.

9.1.4 Material certificates:

The material certificates, detailing the physical and chemical properties, of all the components shall be provided.

9.1.5 Welding joint test (wherever applicable):

All butt-welding joints in the component / system shall be subject to radiographic test with X-rays or gamma rays to 2-2T sensitivity. All the socket welding joints shall be subject to dye-penetrant test.

9.1.6 Soundness test for castings (wherever applicable):

All the castings shall be subject to soundness test with radiographic or ultrasonic technique for flaw detection.

9.1.7 Hydraulic proof pressure test:

The components shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular component.

9.1.8 Environmental Test:

The component shall be subjected to vibration, acoustic, thermal, vacuum, thermo-vacuum, EMI/EMC, shock and endurance testing to the levels provided by HSFC.

9.2 Acceptance Test at Integrated Level

Integrated test need to be done by HSFC after commissioning of the by the party and any support required for the integrated test shall be extended by the party.

9.2.1 Functional test

The functionality of the system shall be demonstrated through tests. Repeated operation of system at different load conditions shall be demonstrated at HSFC.

9.2.2 Environment test

Integrated level test will be done by HSFC.

Testing listed above is indicative in nature, detailed test plan along with test requirement and levels will be mutually evolved during preliminary design review.

10. Documents

The following documents / software shall be provided by the party that is used/generated for the purpose of execution of this contract:

- Detailed design document
- 3-D model and fabrication drawings
- Test plan document
- Qualification plan document / result
- Material test certificate
- Calibration certificate
- Algorithm design document
- Source code for algorithm
- Service life/cycles certificate
- Test certificates as per test plan documents
- Warranty certificate
- Any other document required for execution of this contract.

1. Instructions to Bidders

The bidder is required to submit quotation for the entire works mentioned herein. The incomplete quotations shall be summarily rejected. The deviation, if any, in the bidder's proposal with respect to this document shall be explicitly mentioned in the schedule of deviations to be provided in the quotation. If the bidder does not mention any deviation, it shall be construed by the Department that the bidder agrees to comply with each and every aspect of this document.

It is proposed to brief all interested bidders on the requirements of this RFP in the Pre-bid meeting planned at HSFC, Bangalore on 26/08/19 at 11.00 hrs. Bidders who are interested to quote for the tender has to attend the pre-bid meeting and their willingness for the same shall be communicated in writing to Senior Purchase & Stores officer in any case not later than 3 days from the date of receipt of this document/tendering whichever is earlier. The date of Pre bid meeting will be communicated by the Department. Attending pre bid meeting is an essential criterion to be eligible to quote for the tender. Quotations received from parties who have not participated in the Pre bid meeting shall be considered invalid.

1.1 Execution Plan

The bidder shall provide execution plan for detailed engineering, procurement, inspection, shop fabrication, supply, site fabrication, erection, installation and commissioning with the quotation. The indicative list of sub-vendors from whom the bidder proposes to purchase the materials and the sub-contractors with whom the bidder proposes to sub-delegate part of the work shall be provided. Any change from the submitted list shall be with the written consent from the Department. The bidder shall highlight the works proposed to be done in their own factory and the works proposed to be done by their sub-contractors. Details of infra-structural facilities such as machineries, material handling equipment, factory area, etc. shall be listed. The Department will have the right to scrutinize and to agree/ disagree with the sub-vendors/ sub-contractors proposed by the bidder. The party has to make a technical presentation of this proposal at HSFC Bangalore for evaluation and shortlisting by HSFC (if required).

COMPLIANCE STATEMENT REQUIRED TO BE FILLED AND ENCLOSED ALONGWITH THE TECHNICAL AND COMMERCIAL BID BY THE VENDOR.

Sr. No.	Commercial terms	Compliance/Comments by Vendor
1.	<p>Delivery terms:</p> <p>(a) In case of indigenous stores, the quotation should be on FOR-Destination / Door delivery basis.</p> <p>(b) In case of imported stores, the normal delivery terms shall be FOB/FCA (name of place)</p>	
1.1	<p>Purchaser is having an air consolidation contract and their freight forwarder will arrange to collect the consignment from your premises/will take the responsibility for onward transmission from the point of delivery as per INCOTERMS 2010. This is applicable for import cases.</p>	
2.	<p>Packing charges Inclusive/Exclusive.</p>	
3.	<p>Delivery period – In weeks/Months</p>	
4.	<p>Payment terms:</p> <p>(a) 100% within 30 days after receipt and acceptance (for indigenous).</p> <p>(b) Sight Draft/Letter of Credit(in case of foreign suppliers)</p>	
5.	<p>Country of origin – To be declared in the invoice.</p>	
6.	<p>Name and address of the Indian Agent, if any.</p>	
7.	<p>Percentage of agency commission included in the quoted price – payable in Indian Rupees only directly to the Indian Agent.</p>	
8.	<p>Validity of the offer- Minimum of 120 days from the date of opening.</p>	
9.	<p>If you are an Indian Agent, please enclose the authorization letter of your Principal</p>	
10.	<p>In a tender, either the Indian agent on behalf of the Principal/OEM or Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.</p>	
11.	<p>If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.</p>	
12.	<p>Cost of spares included in the price bid / not included.</p>	
13.	<p>Will you be able to provide consumables / spares for 10 years?</p>	

14.1	<p>Taxes and duties: GST rate:</p> <p>GST will be paid extra as applicable. BIDDER shall indicate the percentage of taxes clearly when quoting the prices.</p> <p>Goods and Service Tax [Within the State] Human Space Flight Centre [HSFC], Bengaluru is eligible for availing Concessional GST issued by Government of India, Ministry of Finance, Department of Revenue, vide Notification No. 45/2017-Central Tax [Rate] dated 14.11.2017 [CSGT 2.5%] and Government of Karnataka, Finance Secretariat, vide Notification No. [45/2017] No. FD 48 CSL 2017, Bengaluru dated 14.11.2017 [SGST 2.5%] for procurement of Goods against production of Certificate issued by an Officer not below the rank of Deputy Secretary to Government of India certifying that the Goods being procured will be used for Research purposes only.</p> <p>Goods and Service Tax [Intra State] Human Space Flight Centre [HSFC], Bengaluru is eligible for availing Concessional GST issued by Government of India, Ministry of Finance, Department of Revenue, vide Notification No. 47/2017-Integrated Tax [Rate] dated 14.11.2017-IGST 5% for procurement of Goods against production of Certificate issued by an Officer not below the rank of Deputy Secretary to Government of India certifying that the Goods being procured will be used for Research purposes only.</p> <p>The PURCHASER is eligible for obtaining concession from the payment of IGST/GST and Customs Duty as per relevant Notifications and the PURCHASER shall issue necessary GST Concession Certificate and Customs Duty Concession Certificate, if required.</p> <p>Taxes in India to the account of Purchaser. Outside India to Seller's/Contractor's account. Please indicate your Tax Registration Number.</p> <p>Wherever installation involved, Income Tax @ 2% will be deducted from the bill and a certificate issued.</p>	
14.2	Customs Duty Concession Certificate (CDCC) will be issued by Purchaser vide notification no. 05/2018 dt 25/01/2018.	
15.	No Insurance is required at Purchaser's cost.	
16.1	For Single part bids one separate sealed envelope are to be sent duly super scribed as follows:	

	1. TECHNICAL & COMMERCIAL BID Please refer instructions.	
16.2	For two part bids two separate sealed envelopes are to be sent duly superscripted as follows : <ol style="list-style-type: none"> 1. Technical & Commercial Bid 2. Price Bid Please refer instructions	
17.	Tender fee of Rs. 590.00 is payable – provide the same in the form of crossed Demand Draft in favour of The Accounts Officer, HSFC, BENGALURU along with the bid but in a separate cover or along with technical bid. On the back side of the D.D, please write your company’s name. Also submit relevant valid documents in case of exemption i.e. MSME, NSIC etc.	
17. a	EMD of Rs. 5.00Laksh is payable – provide the same in the form of crossed Demand Draft in favour of The Accounts Officer, HSFC, BENGALURU along with the bid but in a separate cover or along with technical bid. On the back side of the D.D, please write your company’s name. Also submit relevant valid documents in case of exemption i.e. MSME, NSIC etc. ----- “Bidders shall submit an amount of ₹ 5.00Lakhs with the bid towards Earnest Money Deposit (EMD). The EMD shall be submitted in the form of DD/Banker’s cheque/Bank Guarantee/Fixed Deposit Receipt (FDR) made in the name of Accounts Officer, Space Applications Centre, and be payable at par at Ahmedabad. Bids received without EMD shall be treated as invalid and shall not be considered. The following categories of bidders shall be exempt from paying EMD subject to submission of appropriate documentary evidence with the bid in support thereof (if applicable): <ul style="list-style-type: none"> • Vendors already registered / empanelled with HSFC as authorized vendors. • Overseas bidders submitting offers directly without involving an Indian Representative. • Central PSUs/PSEs and autonomous bodies • Micro and Small Enterprises • Khadi and Village Industries Commission • National Small Industries Corporation • Any other establishments specifically exempted from paying EMD by an order of the Government of India. The EMD of bidders who withdraw their bid during the tender evaluation process shall be forfeited. EMD of unsuccessful bidders shall be refunded without interest after the tender has been awarded, within 30 days of the award of the tender. EMD of successful tenderer may be retained and converted to Security Deposit, if applicable.”	
18.	Language to be used in all correspondence – English	
19.	Measurements – Metric system to be followed	

20.	Whether prequalification of your facility procedure completed (if applicable).	
21.	Specify the Warranty period –However, the warranty requirement if projected in RFP shall prevail.	
22.	Defective/ rejected items if any, are to be replaced free of cost.	
23.	Confirm whether you will be able to provide samples if called for, free of cost.	
24.	Whether approximate weight (net and gross) of the consignment is mentioned.	
25.	Instruction/operational manual to be supplied free of cost.	
26.	Supply and installation is subject to Purchaser's acceptance.	
27.	LC extension charges to your account, in case of delay from your side.	
28.	Items from latest production batch only are to be supplied.	
29.	Wherever Export Licence required, payment will be made after getting export licence and after confirmation by the supplier, with a copy of Export Licence.	
30.	Bank Guarantees (from Nationalized/ Scheduled Bank/ Bank approved by Purchaser. Advance payment for the equal value valid till the completion of contract/acceptance +	
30.1	60 days, is to be provided by you.	
30.2	Towards issue of "Free Issue Material" by Purchaser for the value of the material issued, is to be provided.	
30.2.1	The Bill of material for the material used for the Fabrication work and available balance to be prepared by you and countersigned by the User Department is to be sent along with the final bill for arranging the balance/payment.	
30.3	Towards Performance of the Contract and Product for 5% value valid till the expiry of warranty period. (Performance Bank Guarantee)	
31.	Security Deposit: An amount equivalent to maximum 5% of annual contract value shall be remitted through Account Payee DD/Fixed Deposit Receipt (FDR) in favour of Accounts Officer, HSFC as Security Deposit towards performance of contract valid for a period of 60 days beyond the date of completion of Purchase Order/contract. Security Deposit will be released only after satisfactory completion of the contract. Security Deposit is to be submitted to HSFC by the successful bidder (wherever applicable) on awarding the contract	
32.	Training – free of cost – to be imparted at Purchaser's site.	
33.	Bank charges wherever applicable shall be paid by Purchaser/Contractor to their respective Bankers.	
34.	Arbitration proceedings –	

	Within India as per provisions of Arbitration and Conciliation Act 1996.	
35.	Liquidated Damages - @ 0.5% per week for the delayed portion – maximum 10% of the contract value.	
36.	Force Majeure conditions applicable.	
37.	Acceptance of Fall clause. “The rates as per the charges of the Contract should not in any event exceed the lowest rates, the supplier charge to any other party or organization. If at any time during the period of contract, the supplier reduces the charges to any other party, then they shall forth-with notify such reduction to Head, Purchase & Stores, HSFC and reduce the contract rates subsequently, from the date of coming into force of such reduction” .	
38.	The Contractor shall bear demurrage/penalty charges, if any, incurred by the Purchaser due to delayed presentation of dispatch documents to the Bank / Purchaser or on account of incomplete documents like invoice, packing list, etc.	
39.	You are requested to indicate the registration number; you have for GST as the case may be with concerned Government authorities. Also you are requested to provide company registration details wherever applicable along with copy of the company registration certificate. The offers received without the above information will be summarily rejected.	
40.	The Purchase Order / Contract shall be governed by Indian Law and jurisdiction shall lie in the Courts of Bengaluru, Karnataka, India.	

Annexure III

Compliance Matrix (To be filled by the party)

S. No.	Requirement	Party's reply
1.1	<u>Details of facilities available with party</u> Development facilities.	
1.2	Manufacturing / Fabrication facilities	
1.3	Inspection / Qualification / Testing facilities (O2)	
2.0	Details of manpower including technical staff.	
3.0	Details of in-house design capability like, manpower, software resources and development tools.	
4.0	Annual turn-over with proof.	
5.0	Proof of stores of similar nature already developed and supplied by the party, elsewhere with their cost aspects.	
6.0	Technical details and conceptual line diagram of the proposed system.	
7.1	Details of part of the job proposed to be sub-contracted, if any.	
7.2	If any part of the job is sub-contracted, details of the third party with name, address and their expertise area.	

Technical compliance Matrix (To be filled by the party)

Part shall provide detailed plan in technical proposal in following format:

SI No	Description	Party's reply
1.	Sizing & Realization of components	
2.	System engineering	
3.	Layout of system	
4.	Development of control algorithm & controller	
5.	Display system	
6.	Oxygen compatible gas bottle	
7.	Absolute pressure regulators / Solenoid valve / EPR	
8.	Detailed documentation	
9.	Review: PDR, CDR, Qualification plan, Test Plan, Powering scheme & management plan, Algorithm design review	
9a.	Implementation of review outcome/changes	
10.	Avionics (DAQ, Controller, sensors & software)	
11.	Assembly, Integration & Testing	
12.	Standard for processes	
13.	Material compatibility	
14.	Any other task to make the system complete and functional	

Bid Evaluation Matrix (Essential Parameter)

SL No	Evaluation Criteria	Party Response
1	Development of cabin pressure control system (Capability & Capacity to design and test the system)	Core Competence & previous experience in similar system to be provided
2	Realization (Able to fabricate the aerospace grade component either independently or in collaboration of other reputed vendor component)	Fabrication facility details to be provided.
3	Component level Testing (Functional, leak, pressure, flow characteristic, vibration, thermal, vacuum, thermal-vacuum, EMI/EMC, Shock, Endurance, Thermal performance test) to the level suggested by HSFC. Integrated testing will be done by HSFC	Test facility details, safety permissions to be provided. Anything outsourced also need to be indicated
4	Execution of similar project (financial capability)	Past Experience in similar project
5	Controller and Algorithm	Technical Competence & previous experience in similar system to be provided
6	Oxygen compatible gas bottle and fluid components	Technical Competence & previous experience in similar system to be provided
7	Preliminary design review (compliance to be indicated)	Yes/No

8	Qualification Plan to be submitted	Yes/No
9	Critical design review (compliance to be indicated)	Yes/No
10	3d Model and fabrication drawings to be provided	Yes/No
11	Documentation as per HSFC requirement (compliance to be indicated)	Yes/No
12	Inspection to be offered to HSFC	Yes/No
13	Assembly & Integration	Details of facility and manpower to be provided
14	Delivery period (Due weightage will be given for shorter delivery period)	6 months
15	Material & Test certificate to be provided	Yes/No
16	Welding standard should be adhered.	Yes/No
17	Total Cost & Unit Cost to be provided	Yes/No

Bid Evaluation Matrix (Desirable Parameter)

SL No	Evaluation Criteria	Party Response
1	Manpower details	Technical and support staff details qualification and experience in relevant field to be provided
2	Service life certificate of components to be provided	Yes/No
3	Sensors industrial grade / space grade (to be indicated) & TMR logic	Yes/No
4	Display system to be provided	Yes/No
5	Control system to be provided	Yes/No

Price Compliance Matrix (To be filled by the party)
Cabin Pressure Control System

Party shall provide cost in price quootaion in following format:

Sl. No	Item Description	Qty	Unit	Unit Cost	Total Cost
1	Development Cost	1	lot/lumpsum		
2	Oxygen compatible composite gas bottle with inconel lining	7	Nos		
3	High pressure regulator	1	No		
4	Low pressure regulator	3	Nos		
5	Filters assembly	9	Nos		
6	Fill and drain valve	4	Nos		
7	Safety Relief valve with manual override	1	No		
8	Automatic sealing device	3	Nos		
9	Check valve	4	Nos		
10	High pressure manual valve	3	Nos		
11	Flow restrictor	6	Nos		
12	Vent Solenoid valves	1	Nos		
13	Isolation Solenoid valves	2	Nos		
14	Electro pneumatic valves with manual override (solenoid valves 6mm port)	8	Nos		
15	Electronic pressure regulator (1 PV + 2 SV)	2	Nos		
16	Control algorithm	1	No		
17	Display system	1	No		
18	Sensors	1	Set		
19	Data acquisition and control system, controller & Software	1	No		
20	Inspection	1	lumpsum		
21	NDT Charge	1	lumpsum		
22	Plumbing	1	Set		
23	Assembly + Special cleaning	1	lumpsum		
24	Testing charges	1	lumpsum		
25	Miscellaneous	1	lumpsum		
26	Commissioning & Demonstration	1	lumpsum		
27	Any other component to make the system complete and functional				
	Total				
GST					
P&F Charges					
Total Landed Cost					
L1 bidder will be determined considering the total landed cost to HSFC for all item above, GST and other incidental.					

INSTRUCTIONS TO THE VENDOR:-

(1) In case the bidders propose any other payment terms in deviation with the standard terms mentioned in the Tender Enquiry, it may be noted that applicable cash flow implications will be loaded on the prices quoted for commercial comparison of the offers. If advance payments are insisted by the bidders, interest at the rate of MCLR (Marginal Cost Linked Rate) as notified by State Bank of India from time to time shall be loaded on the prices for price comparison.

(2) Security Deposit:- Security Deposit shall be obtained at **5%** of the value of the Purchase Order. Security Deposit can be submitted through Bank Guarantee or fixed deposit receipt from any of the Scheduled Banks executed on non-judicial stamp paper of appropriate value, and should be valid for a period of sixty days beyond the date for completion of the Purchase Order. In case the vendor fails to furnish the security deposit within the specified date or extended due date, the Purchase Order/Contract shall be cancelled.

In the event of non-execution of the Purchase Order or breach of any terms and conditions of the Purchase Order, the Security Deposit shall be forfeited.

(3) Performance Bank Guarantee:- Successful vendor have to furnish a Performance Bank Guarantee worth **5%** of the contract value in 100 Rupees non-judicial stamp paper of the basic value and shall be valid for a period of sixty days beyond the date for completion of expiry date of warranty period.

Vendors can submit consolidated Bank Guarantee for Security Deposit + Performance Bank Guarantee valid for a period beyond 60 days from the date of completion of warranty obligations.

(4) Liquidated Damages: The delivery date stipulated in the order released will be the essence of the order. If the successful vendor fails to deliver the stores within the time specified in the order or any extension thereof HSFC shall recover from the supplier as liquidated damages a sum of one half percentage (0.5%) of the ordered price of the un-delivered stores for each calendar week of delay and part thereof. The total liquidated damages shall not exceed Ten percent (10%) of the order price of the unit or units so delayed.

(5) In case the bidders fail to comply to the above terms and conditions of Sr. No. 3,4 & 5 in deviation with the standard terms mentioned above, it may please be noted that applicable cashflow implications for each terms and conditions individually will be loaded in the prices quoted for commercial comparison of the offers.

(6) Ultimate Consignee:-

Purchase & Stores Officer,
Human Space Flight Centre
ISRO Headquarters
New BEL Road
Bengaluru 560 094

(7) Tender Terms and Conditions attached. Mention delivery terms, warranty and taxes clearly.

GENERAL TERMS & CONDITIONS

1. DEFINITIONS

- a) The term 'Purchaser' shall mean the President of India or his successors or assignees.
- b) The term 'Contractor' shall mean the person, firm or company with whom or with which the "Purchase Order/Contract" for supply of stores/services is placed and shall be deemed to include the contractor's successors, representatives, heirs, executors and administrators unless excluded by the Purchase Order/Contract.
- c) The term 'Purchase Order / Contract' shall mean the communication signed on behalf of the Purchaser by duly authorized Officer intimating the acceptance on behalf of the Purchaser on the terms and conditions mentioned or referred to in the said communication accepting the tender or offer of the contractor for supply of stores, plant, machinery, equipment and services.
- d) The terms 'Stores' shall mean the goods and services as specified in the Purchase Order/Contract.

2. EVALUATION CRITERIA

- a) During evaluation, Purchaser may request for any clarification and/or additional documents from the bidders.
- b) All responsive bids shall be evaluated with a view to select the lowest [L1] bidder who meets the qualification criteria, techno-commercial aspects and shall be compared on a common platform on the basis of total evaluated cost of each offer which will be arrived at by adding the basic price as well as other charges, and all statutory levies/taxes/duties. Maintenance charges shall be taken into account if it forms part of the tender for the purpose of cost comparison. The financial implication shall be considered as the all-inclusive cost to the Purchaser. Evaluation of the bids shall be done on the basis of landing cost to the Purchaser.
- c) Purchaser discourages advance payment terms. In case of advance payment, for the purpose of evaluation, interest shall be loaded on the amount so paid as advance for the delivery period quoted as per MCLR of State Bank of India prevailing on the date of tender opening. Further, for any delay in executing the contract, Purchaser shall recover interest on the amount paid as advance for the delayed period at the MCLR of State Bank of India prevailing on the date of the payment besides other remedies available for breach of the contract.
- d) If the quoted prices are in different currencies, then for comparison purpose the offers in foreign currencies will be converted into Indian Rupees based on the exchange rate prevailing on the date of tender opening.
- e) If a bidder quotes "NIL" charges/consideration, the bid shall be treated as unresponsive and will not be considered.
- f) Evaluation of the bids shall not be done on the basis of conditional discounts.
- g) Purchaser reserves the right to give preference for procurement of goods in terms of product reservation and preferential / mandatory purchase policy as notified by Government of India from time to time. Bidders claiming any preference shall submit relevant and valid registration certificate along with the tender.
- h) Purchaser reserves the option to increase / decrease the quantity to the extent of 25% of the tendered quantity.
- i) Purchaser reserves the right to accept or reject any quotation in full or part thereof by recording the reasons. The Purchaser shall be under no obligation to accept the lowest or any tender and reserves the right to accept whole or any part of the tender or part of the quantity offered and the bidders shall supply the same at the rates quoted.
- j) Purchaser also reserves the right to reject any offer in the event of non-compliance to tender terms and conditions.

3. OFFER VALIDITY

- a) The offer should be valid for a minimum number of days, as mentioned below, from the date of opening of the bids.

Global Tender: 120 days

Single Tender / Limited Tender / Public Tender [Single Part]: 90 days

Two Part Tender: 120 days for Part-I & 90 days for Part-II.

During the validity period the bidder shall not revoke or cancel or vary the bid except and to the extent required by Purchaser. Purchaser will make all efforts to finalize the contract within the original bid validity. However, in case the contract is not finalized during the original bid validity then the bidder shall be requested to extend the bid validity.

4. TERMS FOR TECHNICAL-BID & PRICE-BID

- a) The price quoted shall be firm and fixed. At the option of the Purchaser, in case of long term contracts where the input cost and other factors are subject to changes, price variation may be accepted as per price variation formula, if specifically mentioned in the tender.
- b) Bidders shall note that the entries for rate, taxes & duties, freight and any other levy shall be entered only in the relevant fields as provided in the price bid form / vendor specified terms.
- c) If specifically mentioned in the tender document/RFP, only the authorized dealers/agents or their accredited representatives of original manufacturers shall submit the quotation with documentary evidence.

- d) All available technical literature, catalogues and other data in support of the specifications and details of the items shall be furnished along with the offer.
- e) Approximate net and gross weight of the items offered shall be indicated in your offer. If dimensional details are available, the same shall also be indicated in the offer.
- f) Stores offered shall strictly conform to the tender specifications. Deviations, if any, shall be clearly indicated by the bidder in the quotation. The bidder shall also indicate the Make/Model number of the stores offered. Test Certificates, wherever necessary, shall be forwarded along with supplies. Wherever options have been called for in our specifications, the bidder shall address all such options.
- g) Any drawings, specifications, end use, etc., which are part of the tender document shall not be disclosed by the bidder to any third party.
- h) Tender number shall be mentioned in all correspondence.

5. PAYMENT TERMS

- a) Normally 100% of the contract/PO value will be made within 30 days of receipt, installation (wherever applicable) & acceptance of the material at Purchaser's site.
- b) Other terms of payment like Sight Draft/Letter of Credit may be considered by the Purchaser on such terms and conditions as may be agreed upon in case of foreign suppliers.
- c) The Sight Draft / Letter of Credit will be operative on presentation of the under mentioned documents:
 - 1. Original Bill of Lading / Airway Bill
 - 2. Commercially certified invoices in triplicate, describing the stores delivered, quantity, unit rate and their total value. The invoice should indicate discounts, and Agency Commission if any separately.
 - 3. Packing List showing individual dimensions and weight of packages.
 - 4. Country of Origin Certificate in duplicate.
 - 5. Test Certificate.
 - 6. Declaration by the Seller that the contents in each case are not less than those entered in the invoices and the quality of the Stores are guaranteed as per the specifications asked for by the Purchaser.
 - 7. Warrantee and guarantee Certificate/s.
- d) For any Services, payment will be made after satisfactory completion of the services and certification to that effect from the Purchaser.
- e) Our Bankers are State Bank of India, Dollars Colony, Bengaluru - 560 054, India.
- f) Any other payment terms offered by the bidders may be considered by the Purchaser provided that all such payments shall be against receipt of the items / completion of service / identified verifiable milestones. Advance payment, if any, shall not exceed 30% of the contract value to private firms and 40% of contract value to a State or Central Government agencies or a Public Sector Undertaking. In case of maintenance contracts, the advance payment shall not exceed the amount payable for 6 months under the contract. Advance payments shall be against Bank Guarantee of equivalent value from any Scheduled Bank in India / International Bank of repute, valid till two months beyond the receipt and acceptance of the product / completion of service.
- g) Purchaser shall bear the Bank charges payable to his Bank, the Contractor shall bear the Bank charges payable to their bank.
- h) GSTN/UIN No.:
- i) Import Export Code: 0100000011

6. TAXES AND DUTIES

- a) Taxes and Duties shall be distinctly shown in the offer.
- b) As a Government of India Department, Purchaser is exempted from payment of Octroi and similar local levies. Vendors shall ensure that necessary Exemption Certificates are obtained by them from the Purchaser to avoid payment of any such levies.
- c) The Purchaser is eligible for concessional rate of GST as per Notification No. 45/2017-Central Tax (Rate) dt.14.11.2017 and Notification No. 47/2017 dt.14.11.2017-Integrated Tax (Rate) issued by Department of Revenue, Ministry of Finance, Government of India. The necessary certificate will be provided by the Purchaser for the items covered under the said notification.
- d) Purchaser is eligible for concessional rate of Customs Duty and IGST on imports as per Notification No. 5/2018-Customs dt.25.01.2018 issued by Department of Revenue, Ministry of Finance, Government of India. For the items covered under the said notification, Purchaser will provide the necessary exemption certificate. Accordingly, prices shall be quoted exclusive of Customs Duty and IGST component.

7. INDIAN AGENTS

- a) Offers made by Indian Agents on behalf of their Principals should be supported by the Performa Invoice of their Principals indicating the commission payable to the Indian Agent and nature of after sales service to be rendered by the Indian Agent.
- b) Indian Agents while quoting on behalf of their principals shall attach valid authorization certificate from their Principal/OEM along with the bid.
- c) If more than one agent/distributors are involved, a copy of certification from OEM mentioning the specific relationship among the vendors involved shall be submitted along with the bid.
- d) In a tender either the Indian Agent on behalf of the Principal/OEM or Principal/ OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.
- e) If an Indian agent submits bid on behalf of the Principal/OEM, the same Indian Agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.
- f) Agency Commission: The percentage / amount of agency commission included in the quoted price and payable to the Indian Agent of foreign suppliers shall be paid directly to the Indian Agent in equivalent Indian Rupees worked out on the basis of Telegraphic Transfer buying rate of exchange prevailing on the date of placement of Purchase Order and within 30 days from the date of receipt and acceptance of stores. In no case the agency commission shall be paid in foreign exchange.

8. DELIVERY TERMS AND DELIVERY PERIOD

- a) The delivery terms are to be quoted in terms of latest INCOTERMS. In case of imported stores the normal delivery terms shall be FOB/FCA (*name of place*). Other terms can also be accepted based on need and suitability. In case of indigenous stores, the quotation should be on FOR-Destination / Door delivery basis.
- b) Delivery period shall be specified. In case the tender calls for installation then the bidders shall mention the schedule for supply and installation separately.
- c) The date of delivery of the stores stipulated in the Purchase Order/Contract shall be deemed to be the essence of the Contract and delivery must be completed on or before the specified dates.
- d) Part shipment is not allowed unless specifically agreed by Purchaser.
- e) Where erection or assembly or commissioning is a part of the Contract, it should be done immediately on notification. The Contractor shall be responsible for any los/ damage sustained due to the delay in fulfilling this responsibility.
- f) For items having shelf life, those with maximum shelf life should be supplied if order is placed.

9. MODE OF DESPATCH:

Generally, stores should be dispatched through Indian Flagged Vessel / Air India or through any other Agency nominated by the Purchaser. A copy of the invoice and packing list should invariably be kept inside each of the packages.

10. SHIPPING MARKS:

The mark on the shipping documents such as invoice, airway bill / bill of lading and on the packages should be as follow:

PURCHASE ORDER NO.
DATED
GOVERNMENT OF INDIA
DEPARTMENT OF SPACE
NAME OF THE CENTRE
Destination:
Port of Entry:

11. DELAY IN COMPLETION / LIQUIDATED DAMAGES

If the Contractor fails to execute the Purchase Order within the time specified in the contract/purchase order or any extension thereof, the Purchaser shall recover from the Contractor as liquidated damages a sum of 0.5% of the PO/Contract value of the undelivered stores for each calendar week of delay or part thereof. The total liquidated damages shall not exceed 10% of the PO/Contract value. Stores will be deemed to have been delivered only when all their components, parts are also delivered. If certain components are not delivered in time, the stores will be considered as delayed until such time as the missing parts are delivered.

12. FORCE MAJEURE:

If at any time during the continuance of the Contract, the performance in whole or in part by either party of any obligation under the Contract shall be prevented or delayed by the reasons of any war, hostility, acts of the public enemy, epidemics, civil commotion, sabotage, fires, floods, quarantine restrictions, strikes, lockouts or act of God provided notice of happening of such event duly evidenced with documents is given in writing by one party to the other within 21 days from the date of occurrence thereof, neither party shall be by reasons of such event, be entitled to terminate the Contract nor shall either party have any claim for damages against the other in respect of such non-performance or the delay in performance, and deliveries under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Purchaser as to whether the deliveries have been so resumed or not, shall be final and conclusive, provided further that if the performance in whole or part of any obligation under the contract is prevented or delayed by reason of any such event for a period exceeding 21 days, either party may at its option terminate the contract provided also that the Purchaser shall be at liberty to take over from the Seller at a price to be fixed by Purchaser, which shall be final, all unused, undamaged and accepted material, bought out components and Goods in course of manufacture in the possession of the Seller at the time of such termination or such portion thereof as the Purchaser may deem fit excepting such materials, bought out components and Goods as the Seller may with the concurrence of the Purchaser elect to retain.

13. SECURITY DEPOSIT

- a) On award of the Purchase Order/Contract the successful bidder shall submit Security Deposit within 15 days of receipt of Purchase Order/Contract, as per the format provided by the Purchaser, for 10% of the Purchase Order value through Bank Guarantee or Fixed Deposit Receipt for satisfactory execution of the Purchase Order and shall be valid for a period of sixty days beyond the date of completion of Purchase Order/Contract. Central PSUs / PSEs / Autonomous Bodies shall be exempted from submitting Security Deposit. However, they shall be required to submit an Indemnity Bond in lieu of Security Deposit.
- b) Non-submission of Security Deposit will entail cancellation of Purchase Order and / or forfeiture of EMD and any other action deemed fit by the Purchaser. The Security Deposit will be returned to the Contractor, without any interest, after completion of all Contractual/Purchase Order obligations.

14. ISSUE OF MATERIALS

If provided in the Contract, Purchaser may issue raw materials / semi-finished products / equipment / any other product to the contractor for the purpose of fabrication / repairs / calibration / testing against Bank Guarantee equivalent to the value of the item being issued and valid till receipt of the item by Purchaser.

15. GUARANTEE / WARRANTY

- a) The guarantee / warranty period as mentioned in the tender shall be indicated along with the quote. Guarantee/Warranty shall commence from the date of installation and acceptance of the complete equipment supplied under the contract.
- b) The Contractor shall guarantee / warranty that the stores supplied shall comply fully with the specifications laid down, for material, workmanship and performance.
- c) If any defects are discovered therein or any defects therein are found to have developed under proper use, arising from faulty design, material or workmanship, the Contractor shall remedy such defects at their own cost provided the Contractor is called upon to do so by the Purchaser who shall state in writing in what respect the stores or any part thereof are faulty.
- d) If, in the opinion of the Purchaser, it becomes necessary to replace or renew any defective stores, such replacement or renewal shall be made by the Contractor free of all costs to the Purchaser.
- e) Should the Contractor fail to rectify the defects, the Purchaser shall have the right to reject or repair or replace at the cost of the Contractor the whole or any portion of the defective stores.
- f) The decision of the Purchaser, notwithstanding any prior approval or acceptance or inspection thereof on behalf of the Purchaser, as to whether or not the stores supplied by the Contractor are defective or any defect has developed

within the guarantee / warranty period or as to whether the nature of the defects requires renewal or replacement, shall be final, conclusive and binding on the Contractor.

- g) To fulfill guarantee conditions outlined above, the Contractor shall furnish a **Performance Bank Guarantee** (in the format prescribed by the Purchaser) from any Scheduled Bank in India or any Bank of International repute for an amount equivalent to 10% of the value of the Purchase Order valid for a period of sixty days beyond the warranty/guarantee period. On the performance and completion of the Purchase Order in all respects, the Performance Bank Guarantee will be returned to the Contractor, without any interest.
- h) All the replacement stores shall have guarantee / warranty from the date of receipt & acceptance of the stores at Purchaser's site.

16. PACKING, FORWARDING & INSURANCE

- a) The Contractor shall pack and crate all stores for road / rail / sea / air shipment suitable for tropical humid climate in accordance with standard practices and in such a manner so as to protect it from damage and deterioration in transit. The contractor shall be held responsible for all damages due to improper packing.
- b) The Contractor shall insure that each box / unit of shipment is legibly and properly marked for correct identification. The failure to comply with this requirement shall make the Contractor liable for additional expenses involved.
- c) The Contractor shall notify the Purchaser the shipment details by fax / email.
- d) The Contractor shall give complete shipment information concerning the net & gross weight, size, content of each package, etc. to the Purchaser.
- e) Normally the Purchaser does not insure the goods. However, the necessity or otherwise of insurance will be as indicated in the Purchase Order/Contract.
- f) In tune with the requirement of international plant protection convention of the FAO, UN the following has become mandatory with immediate effect.
 - 1. All packing materials of any kind of plant origin used for packing shall require treatment including heat-kiln treatment at 56 degree centigrade for a minimum of 30 hours of methylbromide fumigation at 48g/cum for 32 hours of chemical impregnation as per international standards.
 - 2. If the consignments are sent without the aforesaid certificate, all demurrages and other charges for treatment etc. will be to the account of the suppliers.
 - 3. This aspect also should be taken care of while submitting the offers.
 - 4. If the packaging material being used for your product does not come under the category "material of plant origin" (i.e. Leaves, grass, wood etc.) Please certify the same in your quote and ignore the above instructions. However, the same should be ascertained at the time of actual shipment if the order is awarded to you.

17. DESPATCH

- a) The Contractor is responsible for obtaining a clear receipt from the freight forwarder / airlines / transport authorities specifying the dispatch of goods. The consignment should be dispatched with clean Airway Bill / Bill of Lading / Railway Receipt / Lorry Receipt. Purchaser will take no responsibility for short deliveries or wrong supply of goods. Purchaser shall pay for only such stores as are actually received by them in accordance with the Contract.
- b) Wherever required, test certificates, warranty/guarantee certificate should be sent along with the dispatch documents.
- c) The Invoice should contain Purchase Order No., Invoice No., Invoice Date, Country of Origin.
- d) The description, part nos., extended warranty charges, discount, optional accessories, as the case may be, should be clearly mentioned in the invoice and packing list and should be in line with the purchase order. In addition to the ordered items, if any item(s) is supplied the same should also be stated in the invoice & packing list with appropriate remarks and its value shall be declared mentioning "for customs purpose only".
- e) The Invoice/Packing list should also provide Item wise net weight (in K.G.) as well as gross weight (in K.G.) of each package.
- f) A copy of the Invoice/Packing List to be forwarded to the Purchaser, 5 days in advance before shipment, particularly when the shipment is through Supplier's freight forwarder/courier.
- g) Any charges/penalty/demurrage due to non-compliance to the above instructions shall be recovered from the payment due to the Supplier.

18. DEMURRAGE

The Contractor shall bear demurrage/penalty charges, if any, incurred by the Purchaser due to delayed presentation of dispatch documents to the Bank / Purchaser or on account of incomplete documents like invoice, packing list, etc.

19. ACCEPTANCE OF STORES

- a) The Purchaser's representatives shall also be entitled at all reasonable times during manufacture to inspect, examine and test on the Contractor's premises the material and workmanship of all stores to be supplied under the Contract and if part of the said stores is being manufactured on other premises, the Contractor shall obtain for the Purchaser's representative permission to inspect, examine and test as if the equipment were being manufactured on the Contractor's premises. Such inspection, examination and testing shall not release the Contractor from the obligations under this Contract.
- b) For tests on the premises of the Contractor or of any of his sub- Contractors, the Contractor shall provide free of cost assistance, labour, material, electricity, fuel and instruments as may be required or as may be reasonably needed by the Purchaser's representative to carry out the tests efficiently.
- c) When the stores have passed the specified test, the Purchaser's representative shall furnish a certificate to the effect in writing to the Contractor. The Contractor shall provide copies of the test/s certificates to the Purchaser as may be required.

20. TRAINING:

The Contractor shall, if required by the Purchaser, provide facilities for the practical training of Purchaser's engineering / technical personnel and for their active association on the manufacturing processes throughout the manufacturing period of the Contract / stores. Number of such personnel to be mutually agreed upon.

21. CONTRACTOR'S DEFAULT LIABILITY

- a) The Purchaser may upon written notice of default to the Contractor terminate the Contract in whole or in part in circumstances detailed hereunder:
 1. If in the judgment of the Purchaser the Contractor fails to make delivery of stores within the time specified in the Purchase Order or within the period for which extension has been granted by the Purchaser to the Contractor.
 2. If in the judgment of the Purchaser the Contractor fails to comply with any of the other provisions of the Purchase Order.
- b) In the event the Purchaser terminates the Contract in whole or in part as provided in clause 23 (a), the Purchaser reserves the right to purchase upon such terms and in such a manner as Purchaser may deem appropriate, stores similar to that terminated and the Contractor shall be liable to the Purchaser for any additional costs for such similar stores and / or for liquidated damages for delay as defined in clause 20 until such reasonable time as may be required for the final supply of stores.
- c) If the contract is terminated as provided in clause 23(a), the Purchaser in addition to any other rights provided in the Contract, may require the Contractor to transfer title and deliver to the Purchaser under any of the following clauses in the manner as directed by the Purchaser:
 1. Any completed stores
 2. Such partially completed stores, drawing, information and contact right (hereinafter called manufacturing materials) as the Contractor has specifically produced or acquired for the performance of the Contract as terminated. The Purchaser shall pay to the Contractor the Contract price for completed stores and for manufacturing material delivered and accepted by the Purchaser.
- d) In the event the Purchaser does not terminate the Contract as provided in clause 23(a), the Contractor shall continue the performance of the Contract in which case the Contractor shall be liable to the Purchaser for liquidated damages for delay as set out in clause 13 until the stores are accepted.

22. REPLACEMENT

If the stores of any portion thereof is damaged or lost during transit the Purchaser shall give notice to the Contractor setting forth particulars of such stores damaged or lost during transit. The replacement of such stores shall be effected by the Contractor within a reasonable time to avoid unnecessary delay in the intended usage of the stores.

23. REJECTION

Rejected stores will remain at destination at the Contractor's risk and responsibility. If instructions for their disposal are not received from the Contractor within a period specified by the Purchaser, the Purchaser or their representative has, at their discretion, the right to scrap or sell or consign the rejected stores to Contractor's address at the Contractor's entire risk and expense, freight being payable by the Contractor at actuals.

24. ARBITRATION

If any dispute or difference or claims of any kind arises in connection with Contract, such dispute or difference or claim shall be referred by either party to the Arbitration. The Indian Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof, rules made there under and for the time being in force shall be applicable to the Arbitration. The arbitral tribunal shall consist of three arbitrators. Each party to the dispute shall appoint one arbitrator and the two arbitrators so appointed by the parties shall appoint the third arbitrator who shall act as the 'Presiding Arbitrator'.

Any party shall, after appointing an arbitrator within thirty days of arising of any dispute, request the other party in writing to appoint the second arbitrator. If such other party fails to appoint an arbitrator within thirty days of receipt of the written request to do so, such arbitrator shall at the request of the first party, be appointed in accordance with Arbitration and Conciliation Act, 1996. If the two arbitrators appointed by or on behalf the parties fail to agree on the appointment of the third arbitrator within thirty days of the appointment of second arbitrator and if the parties do not otherwise agree, at the request of either party, the third arbitrator shall be appointed in accordance with Arbitration and Conciliation Act, 1996. If any of the arbitrators fails or is unable to act, his successor shall be appointed by the party or person who originally appointed such in the manner set out in this clause as if he was the first appointment.

The decision of the arbitral tribunal shall be pronounced within four months unless otherwise extended by the parties, and in case of difference among the arbitrators, the decision of the majority shall be final and binding on the parties. The right to arbitrate disputes under this Contract shall also survive even after expiry or the termination of this Contract. The venue of arbitration proceedings pursuant to this clause shall be India at Bengaluru and shall be conducted in the English language. Pending the submission of and /or decision on a dispute, difference or claim or until the arbitral award is published; the parties shall continue to perform all their obligations under this Contract without prejudice to a final adjustment in accordance with such award. Regarding fee and any other expenses incurred in connection with the arbitral proceedings and the arbitral award, the arbitral Tribunal shall have the discretion to determine (a) whether costs are payable by one party to another; (b) the amount of such costs; and (c) when such costs are to be paid.

25. APPLICABLE LAW

The Purchase Order / Contract shall be governed by Indian Law and jurisdiction shall lie in the Courts of Bengaluru, Karnataka, India.

26. COUNTER TERMS & CONDITIONS

Counter terms and conditions offered by the bidders shall not be deemed to have been accepted by the Purchaser unless specific written acceptance thereof is obtained from the Purchaser.

27. SECURITY INTEREST

On each item to be delivered under the Contract, including an item of work in progress in respect of which payments have been made in accordance with the terms of the Contract, Purchaser shall have a security interest in such items which shall be deemed to be released only at the time when the applicable deliverable item is finally accepted and delivered to the Purchaser in accordance with the terms of the Contract. Such security interest of the Purchaser shall constitute a prior charge as against any other charge or interest created in respect of such items by any entity.

28. RECOVERY OF SUM DUE

Whenever any claim for the payment of, whether liquidated or not, money arising out of or under the Contract against the Contractor, the Purchaser shall be entitled to recover such sum by appropriating in part or whole, the security deposited by the Contractor, if a security is taken against the Contract. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable as the case may be, shall be deducted from any sum then due or which at any time thereafter may become due to the Contractor under this or any other Contract with the Purchaser. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the Purchaser on demand the remaining balance due. Similarly, if the Purchaser has or makes any claim, whether liquidated or not, against the Contractor under any other Contract with the Purchaser, the payment of all moneys payable under the Contract to the Contractor including the security deposit shall be withheld till such claims of the Purchaser are finally adjudicated upon and paid by the Contractor.

29. LANGUAGE AND MEASURES

All documents pertaining to the Purchase Order including specifications, schedule, notice, correspondence, operating and maintenance instructions, drawings or other writings shall be written in English language. The metric system of measurement shall be used in the contract.

30. INDEMNITY

The Contractor shall warrant and be deemed to have warranted that all stores supplied against this Contract are free and clean of infringement of any Patent, Copyright or Trademark, and shall at all times indemnify the Purchaser against all claims which may be made in respect of the stores for infringement of any right protected by Patent Registration of Design or Trade mark and shall take all risk of accidents or damage which may cause a failure of the

supply from whatever cause arising and the entire responsibility for sufficiency of all means used by him for the fulfillment of the contract.

31. IMPORTANT NOTE

If any of the terms & conditions mentioned in this document is contrary to the RFP / Technical documents, then the terms mentioned in RFP / Technical documents shall prevail.

IT WILL BE DEEMED THAT BIDDERS HAVE NOTED AND ACCEPTED THE TERMS & CONDITIONS OF THE TENDER.

32. TERMINATION

Under the normal circumstances, Termination/Short Closing of the Contract is not foreseen. However, SAC reserves the right to terminate the Contract in whole or in part by giving 30 days' prior notice under the following circumstances:

1. For repeated non-performance in the execution of Contract.
2. If the Service Provider is found to have made any false or fraudulent declaration of statement to obtain the Contract or found to be indulging in unethical or unfair trade practices.
3. When both the Parties mutually agree for termination.
4. If the Contractor fails to perform any other obligations under the Contract.
5. If the Contractor becomes bankrupt or otherwise insolvent.
6. Owing to deficiency of service, breach of Contract.
7. For inefficiency, indiscipline, irregularity, insincerity, indifference in work, disobedience, doubtful credentials/ integrity, etc., at any point of time during the Contract period.
8. Any special circumstances, which must be recorded to justify the Cancellation of the Contract.