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Vikram Sarabhai Space Centre
Department of Space
Indian Space Research Organisation
Thiruvananthapuram-695022
Kerala, India

Request For Proposal (RFP)

on

Processing of Solid Propellant Grains

at

Vikram Sarabhai Space Centre, Thiruvananthapuram

on

Government Owned Company Operated (GOCO) mode

Solid Propulsion and Research Entity
Vikram Sarabhai Space Centre
Thiruvananthapuram

Issue Date	:
Closing Date	:

1. Introduction

Request For Proposal for Processing of Solid Propellant Grains at Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram using VSSC established facilities on Goverment Owned Company Operated (GOCO) mode.

2. Preamble

Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram, is the lead center of ISRO responsible for the design and development of launch vehicle technology. VSSC is an ISO 9001:2015 certified organization and following established standards, norms, procedures and practices. In order to meet the increasing demand of operational launches, industry participation for production, testing and supply of sub-systems & systems are solicited. Delivery of products/services of/for various systems for launch vehicles and associated technologies in compliance with the quality standards, schedule and strict adherence to the safety and security norms prevailing inside the campus shall enable a productive aerospace ecosystem in the country. Towards this the Government Owned Company Operated (GOCO) mode of operation was implemented in VSSC. To include more activities under this umbrella, VSSC is looking forward to participation of private industry for the production, testing and supply of launch vehicle systems and sub-systems. Among other aspects, processing of solid propellant grains through Contractors is being explored.

3. Objective

To carry out processing of solid propellant grains through the personnel deployed at VSSC facility(s) by the CONTRACTOR in compliance with the defined quality standard & schedule as finalized by VSSC for GOCO mode of operation.

4. Scope of the Contract

The activities planned, quantified and scheduled under GOCO contract is attached as ***Annexure 1***. The Contractor shall execute the work using Contractor's work force as per the contract terms and conditions. The activities shall be carried out by the Contractor at identified facilities and compliance to safety in such activities shall be ensured by the CONTRACTOR through their Safety Officer wherever applicable. The CONTRACTOR should have an established safety management system and be conversant with applicable safety practices and carry out all the activities with utmost safety. VSSC shall conduct periodic safety inspection and audit for activities.

5. Facilities and Process

The facilities, tools, machines, equipment, fixtures, utilities and raw materials essentially required to carry out the activities to deliver the product/service are given in ***Annexure 2*** under specific heads, which shall be provided by VSSC. The routine up keeping of such process equipment is in the scope of the GOCO team and shall be carried out as mentioned in ***Annexure 2***. The facility/equipment, if required, shall be shared with

VSSC. All necessary consumables, accessories & spares for upkeep shall be provided by VSSC.

The process to be followed to carry out each activity/service/product is given in ***Annexure 3***. A detailed presentation with respect to the processes to be followed shall be presented in pre-bid meeting.

6. Contract Management Committee

After award of the contract, a Contract Management Committee (CMC) shall be constituted by VSSC with identified members from VSSC and Contractor representative. CMC shall be responsible for review of progress of training, certification of Contract manpower for production, throughput monitoring, monitoring quality of activities completed, change in hardware quantity, monitoring efficiency of manpower, additional requirement of Contract manpower/resources, accounting of rejections, recommendation for invoking LD, etc. The CMC shall essentially meet at the end of every month to evaluate the performance and clear the monthly payment based on the activity completed in the month and also meet at any time as deemed necessary. All issues pertaining to occupational safety, security shall be reported to CMC. Any damages caused to VSSC, as such, by Contract personnel shall be assessed by CMC and compensation if any, shall be recovered. Decision of CMC shall be final and binding.

6.1. Contract and Facility Managers

The Contract shall be managed by the Contract Managers from Contractor and Facility Manager from VSSC and duly nominated by them. During the currency of the Contract, any change in the designated Contract/Facility Manager shall be intimated to the other party. The Contract/Facility Manager shall be responsible for the day-to-day management of the activities under the Contract and they shall act as the focal point of the Contract for their respective entities –Contractor and VSSC.

7. Human Resources

VSSC has arrived at and identified the minimum work force both in terms of category of qualification and number required to execute the activities. To carry out the activities stated in ***Annexure 1***, human resources requirements are tabulated in ***Annexure 4***. Being mission critical activities, quality of products/services are utmost important in conjunction with the delivery schedule. Process team as in ***Annexure 4*** shall be required to be deployed by the Contractor to carry out the activities in GOCO mode. Hence, Contractors shall always ensure the availability of qualified, and skilled personnel in GOCO facilities. The verification of the proposed team of Contractor for their qualification shall be done by VSSC.

VSSC prefer to entrust the activities with a team with prior experience in similar field of operation. For propellant and related processing PESO licensed Contractors are mandatory. As the components and sub-assemblies to be handled are critical to mission application, stipulated quality and safety are of utmost importance and the same shall

be adhered to. Retaining of trained human resources is purely the responsibility of the Contractor to ensure quality safety and delivery schedule.

Other requirements

Security : GOCO team shall comply with the security regulation of VSSC.

Safety : GOCO team shall follow all safety stipulations/guidelines.

Secrecy : The CONTRACTOR and their production team shall abide by the INDIAN OFFICIAL SECRETS ACT and its amendments in vogue and shall provide information of awareness of the crew on the matter in writing.

8. Schedule

The schedule for the activities to be carried out and the throughput requirements as in ***Annexure 1*** shall be prescribed by CMC and honored by the Contractor. Continuity of the activity shall be maintained and completion within stipulated period shall be ensured to maintain anticipated quality & quantity and any halt in process shall be mutually discussed and agreed in CMC, properly assessing the impact on quality & schedule. Facility Manager shall issue the individual activity with schedule of delivery to the Contract Manager. In case of conflict between schedule and activities being carried out, a revised schedule to be prepared by Contract Manager in consultation with Facility Manager. Adherence to schedule and throughput shall be logged for verification by Facility Manager. The quality checkpoints are embedded in the schedule and QA team of Contractor shall generate report at specific stages mentioned in process flow chart for later verification by Facility Manager. Mid-course corrections, if warranted shall be implemented by the Contractor as per the instructions of CMC.

9. Issue of Hardware/ Raw Material

Facility Manager shall issue the necessary hardware/raw materials required for carrying out the activities as per the material issue plan. It is the responsibility of the Contractor to properly store the Raw Material/Hardware, if any, drawn from the stores/supplied for processing at identified places/ discard the byproducts/waste materials at identified places only. The Contractor is also responsible for the storage/protection of finished and semi-finished items, if any. The Raw Material/Hardware, if any, given should be under safe custody of the Contractor. The Contractor has no right to take the Raw Material/Hardware or part of Raw Material/Hardware, whatever provided, out of VSSC or replace a part of it with same material from other sources.

All Raw Material/Hardware, if applicable, shall be handled with care and the Contractor should ensure that the physical damages of any kind do not occur during handling. In case of any damage, the same shall be reported to facility manger immediately.

10. Responsibilities of the Contractor

The Contractor shall form their own Team comprising of supervisors, processing/working personnel for the GOCO activity in VSSC. Safety officers, quality control team shall be a part of GOCO team wherever applicable. The members of the GOCO Team shall be above 18 years and below 60 years of age while working at VSSC. The Contractor should necessarily have experience in propellant or explosive processing operations etc.as specified in ***Annexure 4***. The Contractor should provide the bio-data, police verification certificate, EPF details, credentials and technical capability of the GOCO Team for verification by VSSC prior to start of Contract. The Team shall be positioned at GOCO facility within 3 weeks from the signing of the Contract.

VSSC shall provide support and guidance to the GOCO Team during the initial Phase. However, Contractor should ensure that necessary competence is built up within the GOCO Team so that they can independently take full charge of the activity. The Contractor should also try to retain the competence, so as to ensure seamless progression of activities/services.

The following are the responsibilities of the Contractor:

a. Deploy sufficient and competent human resources within 2 weeks of the date of release of GOCO Purchase Order, to progress and complete the work/ activities/ services meeting the schedule, quantity and quality requirements.
b. The Procedure/ Process Document/ Checklist shared by VSSC shall be studied and strictly followed by the Contractor and any doubts, clarifications etc. must be settled prior to start of activity/ services
c. Schedule the processing/ servicing and activities as per the requirement projected by VSSC under the directions of CMC.
d. Ensure readiness of the facilities, equipment, consumables, tooling and other aids required for the processing/ carrying out the activities.
e. Preparation and maintenance of all process/test logs as per the Procedure/ Process Documents/ Checklist to be ensured.
f. Carry out the activities as per Procedure/Process Document/ Checklist. Major steps involved in the activity are detailed in ***Annexure 3***.
g. Preparation of Production Document/ Activity log for quality/ safety audit and product acceptance/ completion of activities.
h. Routine housekeeping, minor maintenance/cleaning/upkeep of the equipment, fixtures and tools wherever applicable.
i. Contractor shall follow the byproducts/ waste materials disposal mechanisms/guidelines formulated by CMC for the GOCO activities.

11. Inspection, Quality Control, Quality Assurance and Quality Audit

Inspection, Quality Control (QC) and Quality Assurance (QA) procedures and acceptance methodology at various stages of activity shall be as per the Procedure/Process Document issued by the VSSC after the award of contract. Quality/Safety Audits on the activity shall be carried out by VSSC once in every six months (or as and when required). The Contractor shall furnish all the required

documents/reports to VSSC. Final assessment of the product shall be carried out by the QA agency of VSSC.

12. Verification

The Facility Manager/ QA team/ Safety/ CMC shall have the right to verify the process, product, logs, records etc. as applicable during the activity. Such inspection/verification/clearance by CMC does not absolve the Contractor from their responsibility of delivering/meeting the quality &specification spelt out in the Contract.

13. Process Rejections and Replacements

Acceptance/ Rejection criteria of the activity shall be clearly mentioned in the Procedure / Process Document / acceptance standard. The non-acceptance of product, if any, shall be studied and root-cause analysis shall be established by Facility Manager and presented to CMC. If the cause of non-acceptance is due to a wrong/careless process by Contractor, then the cost accrued towards the rejection/damage shall be borne by the Contractor after assessment by CMC. The decision of the VSSC shall be final in this respect. In cases of non-acceptance of products for reasons other than by that of Contractor, the payment for such products shall only be made after clearance by CMC with approval of VSSC.

14. Facility Sharing

VSSC shall provide facilities, equipment, fixtures, etc. required for the activity as included in ***Annexure 2***. Facilities are common and used for both development & production. All facilities offered to use by Contractor on a sharing basis with VSSC shall be agreed to by the Contractor. Whenever needed, priority override shall be discussed in CMC and mutually agreed upon. The Contractor should be willing to reschedule the planned activities accordingly. In case of equipment/facility where usage/ requirement is less, sharing is to be done. The processing schedule for such shared facilities/equipment/items shall be worked out by CMC.

15.Safety, Occupational Health and Environment Management

Proposed GOCO activity of processing of solid propellant grains may involve certain operations which are critical in nature. It is Contractor's responsibility to conduct the activities in a safe manner. Towards this, following are the various aspects that have to be taken care of:

15.1. Support from VSSC

Following infrastructure to ensure safety, occupational health and environment protection shall be provided by the VSSC.

a. Service of first aid center and ambulance in case accidents/medical emergencies.

b. Facility housekeeping (janitorial support only) is the responsibility of the VSSC.
c. Wash room facility – facility available in the campus shall be extended to the Contractor.
d. Drinking water facility – facility available in the campus shall be extended to the Contractor.
e. Essential telephonic connections available in the facility can be utilized by the Contractor.

15.2. General Procedure and safe work practices

a. Work instruction and safety instruction for the production activity shall be as per the Procedure/Process Document of VSSC. GOCO Team must follow the work instructions.
b. Applicable PPEs shall be arranged for the GOCO Team by Contractor as listed in annexure 1.
c. Facility housekeeping shall be the responsibility of the Contractor. Man/material limit as per the safety guidelines should be strictly adhered by the Contractor

15.3. Inspection, testing and preventive maintenance of safety critical equipment and facility

The periodic inspection/testing and preventive maintenance of safety critical equipment/items like building electrical system, fire protection system, crane, building and structure, fire extinguishers and other tools shall be done by VSSC.

15.4. Work permits

Contractor shall not carry out any unplanned works or any other non-routine job not covered in SOP in the facilities offered to them. For carrying out any work or maintenance activities in the facility, work permits shall be obtained from CMC.

15.5. Emergency Planning and Response

Contractor shall follow VSSC emergency plans and instructions. Contractor shall participate in the drills conducted periodically in the VSSC campus.

15.6. Reporting of accidents/ incidents/ near miss and investigation

Any incident/accident that occurs during the activity or any other occasion within the premises of VSSC shall be immediately reported to Facility Manager. Reporting of accidents/ incident or near misses shall be done as per VSSC procedure. Investigation shall be done by VSSC.

15.7. Continuous Improvement

Corrective actions can be suggested during accident/incident/near miss investigation, safety inspection, safety surveillance, safety audit etc. If the corrective actions suggested are related to the Contractor’s purview, then the same shall be implemented by the Contractor. A report on action taken in VSSC prescribed format shall be submitted within three days. Action taken reports shall be verified by VSSC.

15.8. Safety Monitoring

Contractor shall have internal mechanism for monitoring the implementation of safety protocols in the work place through safety inspection. VSSC shall monitor the safety performance of the Contractor through periodic safety surveillance, safety inspection and safety audit.

VSSC safety agency shall have the full authority to stop the work in case of any critical violation of safety requirements. Decision on the nature of violation is fully under the purview of VSSC safety agency. Non-conformances pointed out by the safety officers should be promptly addressed and corrective actions shall be taken.

15.9. Safety Review

Implementation of safety aspects by the Contractor shall be reviewed periodically as decided by the CMC.

16. Alteration/Modification of Facilities/Equipment

The Contractor is not permitted to alter or modify or make any changes to the existing facilities and equipment and machineries. In case any change or modification is an absolute necessity to sustain the activity, the modification need shall be proposed in writing to CMC for perusal and implementation. The decision of CMC shall be final.

17.Statutory Requirements

The contract agency shall comply with the safety regulations and safety guidelines of ISRO/DOS in all their activities. In respect of all personnel, directly or indirectly engaged by the Contractor shall abide by the rules and safety provisions as governed by the below listed requirements with latest amendments.

- The Contractor shall ensure that all the relevant labour laws, applicable from time to time, are adhered to. Contractor shall comply with provisions of Contract Labour Regulation and Abolition Act (CLRA Act).
- All Risk Insurance Policy (ARIP) for a minimum amount of Rs.10 Lakhs per person (comprehensive scheme covering against all accidents/mishaps or exigencies that can arise while working) for the GOCO team shall be taken by the Contractor for the full contract period. Documentary evidence for the same shall be submitted before engaging the Work Force.
- Contractor shall comply with Factories Act/Rules, as applicable and Occupational, Safety, Health and Working Conditions Code 2020 in respect of working hours, rest intervals, leave and overtime etc., to their employees. Contractor shall ensure provision for social security measures under Employee State Insurance Act, Employee Provident Fund, Miscellaneous Provision Act and Employees Compensation Act.
- The holidays shall be in accordance with VSSC as per the existing rules and amendments from time to time.

- Contract agencies/companies should not employ any personnel below 18 years of age on the site.
- The liability for any compensation on account of injury sustained by an employee of the Contractor shall be exclusively that of Contractor and as per statutory norms.
- Contractor shall comply with all statutory requirements, rules, regulations and amendment made time to time by the concerned authorities with respect to the employment and employees.
- Only Indian Nationals shall be engaged as employees by Contractor.
- Other statutory requirements which are applicable, but not limited to, are the following:
  - The Environment Protection Act and Rules
  - The Explosives Act and Rules
  - Petroleum Act and Rules
  - Factories Act and Rules
  - Labor Laws and Rules
  - Gas Cylinder Rules
  - Radiation Protection Rules
  - Static and Mobile Pressure Vessel Rules and
  - Occupational Health and Safety Working Code
- In addition to the above, the contract agency shall observe and abide the safety rules and regulations of ISRO/DOS while undertaking any work within the premises.

Contract Manager shall ensure adequate systems to prevent any loss/ damage to VSSC property due to unsafe actions by GOCO team. Documentary evidence/ undertaking for the same shall be submitted to VSSC before engaging the GOCO Team.

VSSC shall not be responsible for any loss of life/injury or property that has happened by way of an incident/accident due to mismanagement of the facility/poor workmanship/non-compliance to work instructions and safety guidelines during execution of the Contract by the Contractor. The entire responsibility including cost of damages/legal issues, compensation etc. shall be with the Contractor.

18. Changes and Modifications

VSSC reserves the right to modify the qualitative/quantitative requirements and other specifications related to the work at any time that shall be covered by the Contract.

19. Duration

It is envisaged that the GOCO CONTRACT shall be operated for an initial period of 2 years and can be extended for one year each in maximum two times.

20. Payment terms

The cost and applicable GST towards the activities carried out in GOCO mode at VSSC shall be paid to the Contractor after completion of activity and submission of corresponding Document. On completion of processing, the Contractor shall submit the adequate documents in prescribed format. Based on review of the Documents, CMC shall recommend for the payment and the same shall be made with the approval of the competent authority. Contractor shall submit the invoice based on CMC clearance. The payment cleared by CMC shall be made subject to submission of Invoice and supporting documents.

Contractor may request for stage wise payment for each product based on the unit cost and stage wise cost defined for each product under sections 2.8 and 2.9 (in annexure 1). However, when claiming stage wise payment, maximum allowable claim will be restricted to 80% of the unit cost. Remaining 20% will be paid only after completing all the testing & final clearance of the product. In case of uncertainty in the final clearance of product due to unforeseen circumstances, CMC can take final decision on the payment terms.

In cases where contractor is starting with the production of a partially processed product, payment should be claimed by the contractor based on the stage wise cost of work completed by the contractor.

Payment shall be released for the all completed / stage activities. If any rework is caused due to the inefficiency / deviation from the Contractor, no payments will be made for the rework items / activities. For reworks called for due to reasons other than that of the Contractor, payments will be made as per the original type, and will be treated as fresh activity. The items / activities that are beyond the scope of rework, the recovery of the cost of Raw material/ Hardware shall be applicable.

VSSC shall take all efforts to ensure continuous production. However, in the event of deficit in activity due to unforeseen circumstances, where the monthly output is less than 2% of the total PO value, and the Contractor is retaining the minimum manpower inside VSSC premises, for 2 consecutive months, the Contractor will be entitled for Subsistence Amount for each month at a flat rate of 2% of the total PO value per month (i.e approximately 50% of monthly expected production). Contractor is not eligible for claiming payment for the production output if any (based on unit cost or stage wise cost) whenever Subsistence amount is claimed. Quantification of the production output, during the period in which Subsistence Amount is claimed by the party, will be finalized by CMC based on defined stage wise cost. In the event of the period of reduced production (where subsistence amount is claimed by the Contractor) continuing beyond 2 months, VSSC and Contractor can jointly decide for a planned activity call-off for a stipulated period with notice period not less than one month. The decision of the planned call-off shall be recorded in CMC and signed by the representatives of both VSSC and Contractor.

During the period of planned activity call-offs jointly taken by VSSC and Contractor due to change in the requirement or due to any other reason, no payment shall be made by VSSC to the Contractor.

If the period of no production is due to reasons totally attributable to the Contractor, no payment shall be made by VSSC for the period, and a penalty as approved by CMC shall be recovered from the Contractor (as per LD clause).

21. General guidelines

21.1. Working schedule

The working schedule shall be planned by the Contractor towards meeting the requirements. Under normal conditions only regular shift operation is envisaged for the GOCO model. However, in case of exigencies Contractor shall depute personnel for extended working hours in order to complete the work as per the schedule indicated by VSSC.

The working time for the regular shift shall be from 0845hrs to 1715hrs from Monday to Friday. Activities requiring 3 shift operations are mentioned explicitly. However, for meeting the production requirements or completing certain activities that cannot be discontinued unfinished, the working time can be started/extended before/beyond regular time or work can be planned on holidays on a case-to-case basis with the prior permission of VSSC. For any work beyond office hours or specific GOCO where round the clock operation is envisaged, deployment of personnel in 24x7 (3 shift operations) is also envisaged based on the CMC recommendations.

Contract Manager of Contractor shall prepare the daily schedule of activity in advance according to the CMC cleared production/activity schedule and get approval from the Facility Manager of VSSC. The respective Contract /Facility Manager shall be the focal point for the activities and shall be responsible for the day-to-day management and monitoring of the production activities.

21.2. Guidelines for Contractor

- Contractor shall ensure medical fitness of GOCO Team. Annual medical checkup of all members of the GOCO Team must be done preferably by a Doctor qualified in Occupational Health or by a General Physician (MD General Medicine) and the reports to be made available for audit by VSSC. The cost towards this shall be borne by the Contractor.
- Exclusive tamper proof Contractor’s Identity Cards shall be issued by the Contractor for the persons of the GOCO Team. Entry of GOCO Team members into VSSC campus shall be controlled by smart card that shall be provided by VSSC. Only authorized persons of the Contractor shall enter VSSC campus for executing the Contract. VSSC shall implement security measures such as CCTV

surveillance, Biometric access control entry for the GOCO Team members at their work places.

- Members of the GOCO Team of Contractor shall open a savings bank account in a Nationalized Bank and Contractor shall furnish the bank details of their GOCO Team members to VSSC. Contractor should credit monthly salary of the GOCO Team members to their respective bank accounts and give the monthly salary payment statement to VSSC. Contractor shall produce the insurance premium payment status to VSSC for verification.
- Electronic gadgets like Mobile phone/Laptop/portable storage devices or any other electronic gadgets are NOT PERMITTED inside VSSC campus.

21.3. Liquidated Damages (LD)

The schedule of the activity/service is the essence of the Contract. In the event of the Contractor failing to complete the activity within schedule and if the delay or failure is entirely attributable to Contractor, VSSC shall have the right to recover as LD (as approved by CMC) from the Contractor, a sum at the rate of half per cent per week or the part thereof not exceeding a total of 10% (ten percent) of the cost of the activity or combination of activities, so delayed.

21.4. Price Variation Formula

The best and final quoted price shall remain firm and fixed from the date of commencement of the operation. After 24 months, if the contract is extended based on mutual consent, price variation as per GFR 2017 (Appendix-11) guidelines shall be applied and agreed upon during the course of finalization of the CONTRACT. Details at Annexure 5.

21.5. Security Deposit

To ensure successful completion of the Contract, the Contractor should furnish interest free Security Deposit in the form of Bank Guarantee/FDR/ISB/DD from any Scheduled Bank for 3% of the annual value of the Contract without GST and the same should be valid beyond two months from the validity of the Contract. The Security Deposit shall be returned only after successful completion of all contractual obligations.

21.6. Statutory Duties and Taxes

All statutory levies, as applicable from time to time shall be claimed by the Contractor and shall be paid by VSSC. However, in case any special exemption/concession from payment of the same is notified by the Government, the Contractor shall avail the same by obtaining the necessary Certificate, if any, from VSSC.

In the event of such payments of duties and taxes still being demanded, Contractor shall make the payment under protest after obtaining the concurrence of VSSC. For this purpose, the Contractor shall comply with the instructions given by VSSC and provide all requisite information as may be required by VSSC.

21.7. Exchange of Additional Technological Data

If at any time during the tenure of this Contract, any additional technological data relating to the processing of solid propellant grains is generated by VSSC, the same shall be communicated to the Contractor by VSSC. Such additional data generated by VSSC, if necessary, shall be incorporated in the Procedure/Process Document.

21.8 Confidentiality

The Contractor shall be abided by the following:

a. All information and documents to be exchanged pursuant to the contract shall be kept confidential by the Contractor andshallbe used subject to such terms as each party may specify. The Contractor shall not use the information for purposes other than that specified without prior written consent of VSSC.

b. All confidential information shall remain the exclusive property of VSSC. The Contractor agrees that this Contract and the disclosure of the confidential information do not grant or imply any license, interest or right to the recipient in respect to any intellectual property of VSSC.

c. Unpublished information, whether oral, in writing or otherwise, discovered or conceived by the Contractor and exchanged under the provisions of this contract shall not be transmitted to a third party unless otherwise agreed by VSSC.

d. The Contractor shall not sub-license, assign or sub-assign partly or fully the activities, rights, obligations, permissions, etc. received in the Contract to third parties, under any circumstances without the prior written permission of VSSC.

e. VSSC shall enter in to Non-Disclosure Agreement with the Contractor at the time of PO placement.

21.9. Security

The Contractor shall follow all VSSC security instructions applicable for people & processes prevailing at present and those issued from time to time. If any person/persons of the GOCO Team of Contractor violates the security instruction(s) of VSSC, misbehaves or commits any misconduct, VSSC reserves the right to refuse permission to such persons to enter VSSC. In such cases VSSC shall have the right to terminate the Contract without notice.

21.10. Technology Rights

Notwithstanding any further development in technology of the GOCO activity by the Contractor, the technical know-how and technology shall remain the property of VSSC even after completion of the Contract.

21.11. Sales to Third Party

At any time during the tenure of this Contract, the Contractor shall not sell or exchange or mix with or part with technology, drawings, data, process and Production Documents, hardware etc. related to processing of solid propellant grains to any third parties.

Violation of this clause made by the Contractor, if any, shall lead to termination of the Contract by VSSC unilaterally in addition to initiation of legal action by VSSC.

21.12 Security and Protection of information & Intellectual Property

The Contractor shall not divulge the process know-how and basic engineering data regarding the processing of solid propellant grains to any third party or otherwise make it public. However, this provision shall not apply to such technical information and data those are available in the public domain. The Contractor shall not disclose the terms and conditions of this agreement to any third parties during & after completion of the Contract without prior written consent of VSSC except as required under any law or for compliance with any statutory requirements.

The Contractor shall not assign any rights and obligations arising out of the Intellectual Property Rights (IPRs) generated from inventions/activities carried out under the contract to any third Party, without prior written consent of VSSC. All confidential information shall remain the exclusive property of VSSC. Disclosure of the confidential information shall not be construed as licence, interest or right to the receipt in respect to any Intellectual Property Right of the Other party. An undertaking shall be obtained from the contractor in stamp paper.

Party should not copy the Procedure/Process Documents/drawings/Log sheets/Test reports or any other documents pertaining to activity, in part or full and take it outside premises of VSSC as hard copy or soft copy. The personnel involved in the work are to be confined within their area of work, shall not move out of work place and should not interfere with the works carried out in other areas.

21.13 Grievance Redressal and Arbitration

The technical/administrative issues, clarifications and other matters that needs resolution during the execution of the Contract shall be discussed and resolved in CMC. Such decisions shall be approved by Deputy Director (DD), VSSC. The appellate authority for the CMC decisions shall be DD, VSSC. Issues related to financial matters shall be discussed and decided by Competent Authority as per norms of VSSC.

Any dispute, disagreement or question arising out of or relating to or in consequence of the Contractor to its fulfilment, or the validity of enforcement thereof which cannot be settled mutually through CMC or by DD, VSSC or by any Competent Authority of VSSC or the settlement of which is not herein specifically provided for, shall be referred to arbitration within 30 (thirty) days from the date either party informs the other in writing that such dispute, disagreement exists.

The Arbitration proceedings shall be conducted in the court of Thiruvananthapuram District, in accordance with and subject to the provisions of Indian Arbitration and Conciliation Act 1996 (Act 26 of 1996) and Arbitration and Conciliation [Amendment] Act, 2015 and as amended from time to time. Each party shall bear its own cost of preparing and presenting its case. The cost of arbitration including the fees and expenses of the Arbitrator shall be shared equally by the parties unless the award provides otherwise. The enforcement of the award shall be governed by the rules and

procedures in force in the state of Kerala in which it is to be executed. Performance under this Contract shall, however, continue during arbitration proceedings and no payment due or payable by the parties hereto shall be withheld unless any such payment is/or forms a part of the subject matter of arbitration proceedings.

21.14. Indemnity

The Contractor shall indemnify VSSC for any patent infringement on the process knowhow supplied by VSSC. Also, the Contractor shall be required to indemnify VSSC for any damage to VSSC or to third parties due to negligence on his part (including actions of his GOCO Team).

21.15. Force Majeure

Neither VSSC nor Contractor shall be considered in default in the performance of its obligations under the Contract, if such performance is prevented or delayed for any causes beyond the reasonable control of the party affected by eventualities such as war, hostilities, revolution, riots, civil commotion, strikes etc., or because of any epidemics, fire accidents, floods, earthquake etc., or because of any law and order situation, proclamation or regulation or ordinance of any government or sub-division thereof, or because of an act of God provided notices in writing of any such cause with necessary evidence that the obligation under the agreement is affected or prevented or delayed is given within 14 days from the happening of the event and in case it is not possible to serve notice within the said fourteen day period, then, within the shortest possible period without delay. As soon as the cause of force majeure has been removed, the party whose ability to perform his obligation has been affected shall notify the other party of the actual delay that has occurred due such force majeure condition.

21.16. Termination of Contract

Under normal circumstances, termination of the contract is not foreseen. However, in the case of non-compliance to or non-performance of the terms and conditions of the agreement set out in this Contract by either the Contractor or VSSC, both the parties shall have the right to terminate this Contract, wholly or partly, by giving a notice of one month in writing to the other party. The termination of this Contract for any other reason shall be by mutual consent.

Upon termination of the Contract:

a. The Contractor shall not be entitled either to use in part or full the know-how relating to processing of solid propellant grains obtained from VSSC or to transfer it to any third party.
b. The Contractor shall return to VSSC forthwith all technical documents, technical data, including drawings, free issues etc. given by VSSC or generated during the Contract period by the Contractor.
c. Both parties shall settle accounts expeditiously, by mutual agreement.

21.17. Ownership

The complete ownership of the facility shall be with VSSC, ISRO, Govt. of India and the Contractor shall at no point of time have any ownership rights on the facility. The GOCO Team deployed shall be employees of the Contractor and shall not claim to have been employed by VSSC. VSSC has no responsibility towards the Contractor's employees.

21.18. Applicable Law

This Contract shall be governed by and interpreted and construed in accordance with the laws of India.

21.19. Jurisdiction

The Courts of Thiruvananthapuram District only shall have jurisdiction to deal with the award and decide any matter relating to disputes arising out of this Contract.

21.20. Infringement

VSSC shall not be responsible if the Contractor infringes any applicable laws or statutes in force during the currency of the Contract.

21.21. Notices

Any notice to either party under this agreement shall be deemed to be validly served, if sent by registered post or electronically like fax/e-mail followed by a copy in confirmation by registered post to the registered office, hereinbefore mentioned.

21.22. Languages and System of Measurement

All documents and correspondence should only be in the English-Hindi language. The SI system of measurement shall be used for this Contract.

21.23. VSSC's Banker

VSSC's Bankers shall be State Bank of India (SBI), Thumba Branch, Thiruvananthapuram, Pin 695022, Kerala, India.

22. Criteria for Evaluation of Proposal

22.1. General

The RFP responses shall contain complete information of the Contractor, its human resources, infrastructure, assets, financial standing, line of business and credentials, details of similar works executed etc. Every claim shall be supported with documentary evidence. The responses shall be evaluated and processed with the objective of maximizing production while minimizing the unit cost of production.

22.2. Essential criteria for evaluation of Proposal

1. Contractors registered in India (under The Companies Act, 2013) only need to participate.

2. Contractors having minimum 2-year experience in processing of solid propellant/explosive and having own facilities (minimum 500-ton per annum) for the same only need to apply. Relevant purchase orders/work orders obtained from and executed in a union government / state government / all PSUs need to be attached with the bid.

3. Contractor must possess a valid explosive license for processing of slurry and emulsion explosives (class 2) issued by the statutory body.

4. Contractor must be an ISO 9001 certified organisation.

5. The activities in VSSC are unique, schedule critical, highly specialized and complex in nature. Hence it is necessary for the Contractors to have adequate experience in the specified domain of activities. Towards this, prior experience of the contractor for a minimum period of 2 years strictly in the specified domain of activities is essential.

6. The contractor should have executed at least a single purchase order of the bidding value or two purchase orders each for 50% of bidding value or three purchase orders each for 33% of bidding value with in last 5 financial years starting with the current financial year.

7. Contractors should have an established management structure and shall possess human resources with adequate knowledge, skill and experience in the areas of activity domain specified.

8. For participation in bidding process and submission bids, all interested bidders shall attend the pre-bid meeting mandatorily online or offline and the date of which is indicated in the RFP document/tender.

9. The work described under this RFP document is inherently hazardous in nature (explosive hazard). Hence, requirements concerning explosive license, minimum turnover and prior experience in the domain of work is a mandatory criterion for qualification of the contractor for this contract.

Note:

1. *All information provided above by the CONTRACTOR shall be supported with documentary evidence. Brochure, if any, detailing the CONTRACTOR profile shall be submitted. Copy of the previous similar purchase/work orders executed by the CONTRACTOR also may be appended.*
2. *The final evaluation of the responses form Contractors* shall *be based on inputs furnished against our criteria, assessment based on feedback from customers and overall assessment.*

Contractors who are meeting the requirements as specified in clause 22.2 above and are interested in associating with ISRO for processing of solid propellant grains at VSSC, Thiruvananthapuram shall submit their bid along with copies of supporting

documents for verification/evaluation at VSSC and attend the mandatory pre-bid meeting.

Checklist *for the supporting documents*
(Filled checklist to be submitted by the Contractor along with the bid)

Table 1: Checklist for Supporting Document

Sl. No.	Document / Proof	Attached/ Not-attached	Page number of supporting documents attached	Remarks
1	Company registration details *(Clause 22.2.1)*			
2	Proof of prior experience of the contractor for a minimum period of 2 years strictly in the specified domain of activities (relevant purchase orders/work orders obtained from and executed in a union government / state government / all PSUs need to be attached with the bid) along with proof of owning explosive / propellant processing facilities *(Clause 22.2.2)*			
3	Proof of valid explosive license issued by statutory body *(Clause 22.2.3)*			
4	Proof of valid ISO 9001 certification of the Contractor *(Clause 22.2.4)*			
5	Copy of previous purchase/work orders executed by the Contractor (least a single purchase order of the bidding value or two purchase orders each for 50% of bidding value or three purchase orders each for 33% of bidding value with in last 5 financial years starting with the current financial year*) (Clause 22.2.6)*			
6	Company profile, management structure, human resources and their experience *(Clause 22.2.7)*			

23. RFP Process

23.1 RFP Terminology

Table 2: Terminology

Acceptance tests	Testing/evaluation done in test facility/laboratory to evaluate the quality and accept the product for use.
Accounts	The Division in VSSC dealing with payment of bills and settling the payment related matters pertaining to this Contract.
DD Entity	Deputy Director of respective Entity in VSSC.
Calibration	Process by which all the measuring/testing/analysis equipment/ instruments are verified periodically for accuracy & precision.
Contract	An agreement between the VSSC and the Contractor mentioning the agreed terms for the execution of the activities as stipulated in the RFP.
Contract Manager	Officer duly appointed by the Contractor representing their respective entities and responsible for managing and monitoring the day-to-day activities under the Contract.
Facility Manager	Officer duly appointed by the VSSC representing their respective entities and responsible for managing and monitoring the day-to-day activities under the Contract.
Configuration Control	The process of approving drawings/documents supplied by the VSSC by the Configuration Control Board (CCB) set up by the VSSC. Any change from the existing approved drawing/document shall be reviewed and approved by CCB.
VSSC	Vikram Sarabhai Space Centre (VSSC), the lead center of ISRO, which is soliciting the RFP.
ISRO	Indian Space Research Organisation
DOS	Department of Space
Drawings	The drawings of all the components, finished product, accessories and fixtures, sub-assemblies and stages which form part of Process Document supplied by VSSC.
Engineer	Qualified personnel (Graduate engineer/Science post-graduate level) who are responsible for overall supervision and management of each process/stage ensuring safety and quality as per specified safety/ process document. He shall be responsible for safe conduct of all the operations during processing as per the safety precautions mentioned in the Procedure/Process Document.
FIM	Free Issue Materials are chemicals/materials/equipment/ accessories/spares issued by VSSC to the Contractor during the Contract period. The items other than consumables and raw

	materials for processing are to be returned by the Contractor in good condition on completion/termination of Contract. Necessary security/indemnity requirement as specified by the VSSC shall have to be borne by the Contractor in this regard. The Contractor shall also provide a periodic consumption statement for the consumable and raw materials.
Fixtures	The accessories like work tables, compressors, furnaces etc. provided by VSSC for component fabrication, assembly etc.
Inspection	Activity carried out to check the quality of the process/activity/product at an intermediate stage. This includes dimensional inspection and non-destructive (Visual, Radiography and Ultrasonic test) evaluation.
CMC	Contract Management Committee (CMC) formed with persons from both VSSC and Contractor respectively. The CMC is formed to schedule and monitor the production activities as per the RFP. All the issues related to schedules and processing activities shall be brought to the CMC for its resolution. The CMC shall also certify the production for the month at the end of each month which shall be the basis for the payment to the Contractor.
PPE	Personal Protection Equipment employed for safe conduct of all the process operations without personal injury/suffocation/illness to operators and staff working in the facility. Supply of PPEs shall be decided on case by case by CMC.
Production Schedule	The schedule prepared jointly by VSSC and the Contractor that details the item wise production quantity and sequence with start time/date and end time/date.
Process/ Process document	A document supplied by the VSSC that contain descriptive details of the activity/system, specification, sequential process steps involved, elements/components required (wherever applicable). The Procedure/Process Document also contain details of consumables, tools, equipment required to perform the activity & their specification as well as process log sheets, checklists and drawings.
Production Document	A document containing all the end-to-end essential details of the whole process and product including date/period of activity, identification numbers, process parameters, test results and product evaluation parameters. This document is to be generated by the Contractor and submitted to VSSC for review along with each product/batch in the format prescribed by CMC.
Properties	Parameters of intermediate/final product evaluated at identified laboratories for its characterization/evaluation.
Purchase	The Division in VSSC dealing with rules and regulations pertaining to awarding the Contract and operating the same for a specified period.

QC Officer	Quality Control Officer responsible for maintaining the overall quality of all the operations as per the specifications mentioned in the Procedure/Process Document. Qualified QC officers should be deputed by the Contractor and they shall be responsible for in-process checks, and overall quality of activity.
Store	Identified location inside the VSSC premises where all the raw materials, accessories and consumables are stored under specified conditions.
Safety Officer	Officer responsible for maintaining the safety management system and general safety protocols in force. Safety officers shall be deputed by the Contractor and they shall be responsible for in-process & overall safety. Safety lapses, if any, shall be reported to VSSC's Facility Manager.
Supervisor	Qualified personnel (Engineering diploma/Science graduate level) who is responsible for supervising the individual process operations and ensuring safety for the operations and quality of the product as per specified safety/Process Document.
Technician	Staff engaged in conducting the operations as directed by supervisor/engineer.
Contractor	A Contractor who enters into a Contract with VSSC for providing the services as stipulated in the RFP.

24. Per month throughput & human resources contribution

The human resources requirement per item description and the expected throughput of human resources per month (25 days) is as given below for correlating human resources with the item description.

Table 3: HR contribution

Sl No	Item Description	Work Contribution in %						Quantity Per Month (25 Days)	Unit of measure
		B Tech	M Sc	Dip	BSc	ITI/ CC	Skilled		
1.	Realization of PS0M-XL HES	240	0	228	0	1116	78	1	Nos.
2.	Realization of PS0M-XL MS	240	0	228	0	1116	90	1	Nos.

3.	Realization of PS0M-XL NES	240	0	228	0	1116	360	1	Nos.
4.	Realization of RS1 motor grain	18	0	18	0	315	110	4.5	Nos.
5.	Realization of RS2 motor grain	9	0	13	0	180	50	3	Nos.
6.	Realization of Ullage motor grain	9	0	9	0	81	62	2.25	Nos.
7.	Realization of S200 main igniter	13	0	13	0	45	0	0.5	Nos.
8.	Realization of S139 main igniter	18	0	18	0	54	0	0.75	Nos.
9.	Realization of S139/ S200 secondary igniter	27	0	22	0	81	0	1.5	Nos.
10.	Realization of HPS3 igniter	9	0	13	0	27	0	0.6667	Nos.
11.	Realization of PS0M-XL type II igniter	9	0	9	0	72	0	2	Nos.
12.	UBR testing	0	0	100	0	200	0	125.00	Nos.

25. Bid Format

This offer is invited on a two-part bid basis, namely, **Part-I**: Techno Commercial bid & **Part-II**: Price bid

25.1. Part-I: Techno Commercial bid:

This part of the bid shall consist of compliance and confirmation of technical specifications of this enquiry. Minor deviations if any, shall be clearly spelt out, without

which it shall be deemed that the offer is in compliance with the tender enquiry specification in total (details of parties' capabilities, previous experience etc.). Compliance matrix attached as per ***Table 1*** shall be duly filled up with appropriate comments, wherever warranted and supporting documentary evidence(s).

25.2. Part-II Price bid:

The price bid shall be submitted in the format given below for the detailed scope of work defined under in this RFP. Definition of unit cost for each product / activity as % share of total purchase order / bid value is defined under Annexure 1.

The Service Provider for GOCO shall submit their quote as per the following matrix:

Table 4: Quote Matrix

Sl. No.	Item description	Quantity Per Year	Unit of measure	Unit Rate in Rupees	Cost for One Year
1.	Realization of PS0M-XL HES	10	Nos.		
2.	Realization of PS0M-XL MS	10	Nos.		
3.	Realization of PS0M-XL NES	10	Nos.		
4.	Realization of RS1 motor grain	54	Nos.		
5.	Realization of RS2 motor grain	36	Nos.		
6.	Realization of Ullage motor grain	27	Nos.		
7	Realization of S200 main igniter	6	Nos.		
8	Realization of S139 main igniter	9	Nos.		
9	Realization of S139/ S200 secondary igniter	18	Nos.		
10	Realization of HPS3 igniter	8	Nos.		
11	Realization of PS0M-XL type II igniter	24	Nos.		

12	UBR testing	1500	Nos.		
				Total cost for one year (A)	
				Total cost for two years (B=A x 2)	
				Goods & Service Tax (GST) (C=18% of B)	
				Grand Total (D=B+C)	

Note:

- Quantity per year is for calculation purpose only. VSSC reserves the right to reduce/ increase or not to order.
- It shall be noted that Only Offers with total basic price (B) equal to or higher than 90% of total estimated basic cost of the tender only shall be qualified for tender evaluation. From the qualified offers, the one, in which, the landed cost (grand total) is the lowest, shall be selected.

25. Time Frame for The Implementation of the Purchase Order

T0 = Order acceptance date (order acceptance shall be communicated within reasonable period)
T1 = T0+2 weeks = Within 2 weeks complete the recruitment, verification, medical check-up of all personnel's who are going to be deployed for GOCO operation.
T2 = T1+1 week = Deployment of Personnel at VSSC for work.

Annexure-1

Major Process/activities (planned, quantified, scheduled) and deliverables of Proposed processing of solid propellant grains

1. Overview

Among other technologies, solid propulsion is one of the key areas in which VSSC has been working since its inception and production through external parties/industries (CONTRACTORs) is being explored in this area too. It is proposed to offer the processing of solid propellant grains under the Government Owned Company Operated (GOCO) mode.

Objective is to carry out the processing of solid propellant grains at VSSC (Department) by the CONTRACTOR through their personnel deployed. All the necessary input FIMs, facilities, equipment, fixtures and utilities will be provided by the Department.

1.1. Activity description

Solid propellant grains are products with solid propellant cast in thermally insulated metallic hardware (case bonded) / free standing restrictor tubes. A typical solid propellant grain is shown in schematic figure given below (Figure 1). There are different types of solid propellant grains with various sizes. Igniters are free standing propellant grains cast in paper tubes. The details and sizes of different solid propellant grains are provided in the Table 1. The major activities include rubber compound preparation, hardware handling, grit blasting, rubber lining, specimen preparation, autoclave curing, liner spray / brush coating, preparation & weighing of propellant raw materials, propellant mixing, propellant casting, curing, de-coring, inhibition resin preparation, loose flap filling, propellant finishing, ultrasonic burn rate testing of propellant, disposal of propellant waste through pit burning etc. The maintenance and upkeep of process logs, facility logs and quality control function also form part of the processing activity.

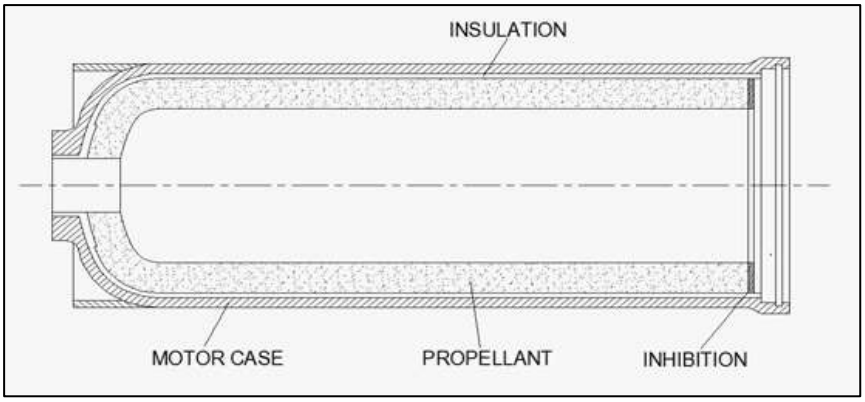


Figure 1: Configuration of a typical solid propellant grain

1.2. List of products and quantity

The list of products & quantity identified / proposed for production under the contract is given below.

Table 1: List of products / service and quantity

Sl. No.	Item	Quantity for 2 years (nos.)	Size (mm)	Approx. propellant / hardware mass per grain (kg)
1.	PS0M-XL HES	20	Ø 1000 x 4500 L	4000
2.	PS0M-XL MS	20	Ø 1000 x 4500 L	4500
3.	PS0M-XL NES	20	Ø 1000 x 4500 L	4000
4.	RS1 motor	108	Ø 202 x 1064 L	29
5.	RS2 motor	72	Ø 202 x 585 L	18
6.	Ullage motors	54	Ø 202 x 947 L	42
7.	S200 main igniter	12	Ø 290 x 1000 L	30
8.	S139 main igniter	18	Ø 290 x 1000 L	35
9.	S139 / S200 secondary igniter	36	Ø 180 x 334 L	7
10.	HPS3 igniter	16	Ø 337 x 410.2 L	12

Sl. No.	Item	Quantity for 2 years (nos.)	Size (mm)	Approx. propellant / hardware mass per grain (kg)
11.	PS0M-XL type II igniter	48	Ø 226 x 1099 L	19
12.	UBR testing	3000	-	-

In addition to the above listed products, production of new products also may be required. Refer section 2.8 in annexure 1 for the categories & unit cost (as a % of contract value) of new products.

2. Major operations involved in the processing

2.1. Process steps in processing of solid propellant grain

The processing of solid propellant grains involves the following operations / activities:

Table 2: List of major activities / operations during processing of solid propellant grains

Sl. No.	Operation	Activities involved
1.	Hardware handling	• Receipt visual inspection & identification labeling • Hardware weighing • Assembly / dis-assembly of harness, movement management of hardware between facilities, support for handling of hardware inside process facilities
2.	Hardware preparation	• Receipt visual inspection • Cleaning of hardware by sand / cumite blasting, degreasing & primer application. • This is an extremely labor-intensive activity which require specialized skill in grit blasting for good quality control.

Sl. No.	Operation	Activities involved
3.	Rubber compounding & sheet processing	• Weighing and mixing of rubber compounds • Calendaring of rubber sheets to the required thickness and storage • Sample specimen preparation, re-milling, storage etc.
4.	Insulation lining	• Laying of synthetic rubber insulation. • Preparation of sample coupons. • This is an extremely labor-intensive activity which require specialized skill in rubber lining for good quality control.
5.	Autoclave curing	• Placing the insulated hardware inside the autoclave, operation of the autoclave under specified temperature & pressure regime and monitoring the parameters.
6.	Insulation finishing	• Trimming the insulation as per dimensional requirement followed by abrasion using abrading wheels.
7.	Pre-heating & liner application	• Pre-heating the insulated motor in oven at specified conditions of time & temperature. • Liner preparation, moisture sampling and coating the insulation surface by brushing / spraying. Coating of sample sheets and tubes for evaluation of interface properties.
8.	Raw material preparation	• Transportation of all identified raw materials from stores to process facilities. • Drying of raw materials, as per requirement • Sampling as per requirement • Sieving of all raw materials in specified vibro-sieves / manual sieving.

Sl. No.	Operation	Activities involved
		• Melting of weighed quantity of crosslinking agent as per standard procedure (for igniter grains processing) • Weighing of all materials in specified weighing balances and proper labeling for identification. • Grinding of sieved Ammonium Perchlorate (AP) as per standard procedure. Particle size analysis of sample grinding material. • Blending of AP Coarse (Av. particle size: 300 to 340 microns) with AP Fines (Av. particle size: 40 to 50 microns) in specified ratio • Transportation of weighed raw materials to mixing stations in sealed containers with proper covering and labeling. • Shifting back the excess raw materials to stores and waste materials to identified bay. • In-process sampling and sample delivery to laboratory with identification.
9.	Propellant mixing in horizontal mixers / kneaders	• Receipt inspection of all raw materials. • Cleaning and visual inspection of pre-mix kneader inside surface / mixing bowl. • FFRB checking • Circulation of hot water through mixer jacket at specified temperature. • Charging of the raw materials as per the mixing sequence. • Using of sieves over the mixer for AP Fines & blend addition. • Operation of the mixer as per standard procedure. • In-process sampling & sample delivery to laboratory with identification.

Sl. No.	Operation	Activities involved
		• Unloading, weighing & shifting of propellant pre-mix slurry from pre-mix kneader to final mix kneader. • Slurry warming-up, curative addition, final mixing unloading, weighing and shifting to casting station with proper covering. • Cleaning of mixer as per standard procedure. • Shifting of waste propellant to storage bay.
10.	Casting of cartons & 2 kg	• Vacuum chamber and its sub-system cleaning, readiness for casting of carton and 2kg motors. • Propellant unloading and shifting for carton & 2kg motor casting as per the standard operating procedure, dispatch of the same to oven for curing. • Storage of cartons & 2 kg motors. • Post cast fixture cleaning operation as per the standard operating procedure.
11.	Propellant mixing in vertical mixer	• FFRB checking • Receipt inspection of all raw materials in bins, assembled VM bowls, dispatch of pre-mix bowl. • Cleaning and assembly of vibroscreen, feed lines and feed bins. • Dispatch of empty bins to raw material facilities. • Cleaning, readiness and visual inspection of VM blades for pre-mix, final mix operation. • Circulation of hot water through VM bowl jacket at specified temperature. • SCADA Operation • Charging of the raw materials through vibroscreen and feed lines as per the mixing sequence and standard operating procedure. • Operation of the mixer as per standard procedure.

Sl. No.	Operation	Activities involved
		• In-process sampling & sample delivery to laboratory with identification. • Cleaning and visual inspection of pre-mix bowl for final mix as per the procedure. • Slurry warming-up, curative addition, final mixing unloading, weighing and shifting to casting station with proper covering. • Cleaning of mixer blade, vibro-sieve, mixer shroud, feed lines and other sub-systems as per standard procedure. • Shifting of waste propellant to storage bay. • Periodical checkups and maintenance of vertical mixer system (dismantling of all lines, cleaning, assembly, liquid seal cleaning & assembly, DOA removal from shroud, refilling etc) as per standard operating procedure. • Load testing of all lifting tackles/ handling items.
12.	Assembly of casting fixtures	• Cleaning and visual inspection of all casting fixtures, mandrels and accessories cleared for processing. • Assembly of feed hoppers, mandrels, feed hoses, valves, gaskets etc. as per standard procedure. • Measurement and recording of assembly related dimensions wherever specified using standard instruments. • Tightening of all fasteners as per torque requirement
13.	Casting, curing & de-coring	• Receipt of liner applied hardware and inspection. • Supervision during transportation to casting station with proper covering.

Sl. No.	Operation	Activities involved
		• Identification marking on motor hardware / restrictor tube. • Operation of vacuum pumps. • Propellant casting (both vacuum casting to feed hopper and pressure casting) as per specified process conditions. • Circulation of hot water through feed hopper at specified temperature. • Removal of excess propellant from each motor after completion of casting. • Dismantling of cast motors and dis-assembly of casting fixtures. • Covering of cast motors and shifting to curing ovens in batches. • Cleaning of all components/accessories used for casting and storing in identified location. • Shifting of waste propellant to storage bay. • Placing the cast motor inside identified oven. • Switching ON the oven and setting the temperature in specified range. • Supervision of oven curing and recording the temperature on hourly basis. • Switching OFF the oven after scheduled duration and providing compensation, if any. • Shifting the motors/ grains to de-coring facility in batches. • De-coring the motors/grains as per standard procedure. • Storage of mandrels in identified location. • Delivery of the motors/grains to propellant finishing section.

Sl. No.	Operation	Activities involved
14.	Inhibition Resin Premix Preparation	• Raw material weighing, sieving (hand/in vibro sieve), drying in oven till moisture limit is achieved • Mixer cleaning by suitable solvents and addition of raw materials to mixer as per document. • Mixing & vacuum drying of materials as per process document. • Sample collection for testing based on requirement. • Discharging & bottling of resin into HDPE/plastic containers (0.5/1/2L) (with nitrogen blanketing) • Sample preparation (Mechanical, interface, thermal & erosion) & positioning to laboratory as part of batch qualification. • Storage of inhibition resin premix bottles in identified locations. (Bonded Store/Storage facility) • Transportation of premix bottles to processing facility for inhibition activities based on requirement.
15.	Propellant trimming & inhibition	• Receipt & inspection of motors/grains in propellant finishing facilities. • Manual hand trimming of propellant to the specified dimensions as per approved drawing. • Collection & transportation of epoxy resin components from stores to process facilities. • Filling of loose flap gap in solid propellant motors/grains with epoxy resin system. • Preparation of propellant surface & port for inhibition application including grain port sealing by profeel sheets & Aluminum foil placement for inhibition buildup. • Weighing of inhibition & epoxy components for application as per process documents.

Sl. No.	Operation	Activities involved
		• Inhibition resin final mixing and pouring of inhibition (both ends) as per dimensional specification. Build-up of inhibition to required thickness, wherever required. • Handling, lifting and tilting (vertical to horizontal or vice versa) of motors/grains during propellant finishing activities using tilting fixtures and cranes. • Proper covering of the motor/grain after inhibition. • Shifting of inhibited motor/grain to NDT facility and back to storage bay based on requirement. • Shifting of trimmed propellant to waste storage bay. • Disposal of remaining inhibition resin, epoxy resin components, HDPE containers, cotton waste & other inhibition chemicals as per identified procedure. • Repair work in inhibition, filled epoxy whenever necessitated based on radiography observation/visual inspection.
16.	Visual & dimensional inspection	• Final visual inspection of the hardware, propellant port and end inhibition surface and recording of observations. • Dimensional inspection as per drawing using calibrated instruments and recording the same in log book. • Conducting re-inspection, if required.
17.	Storage Protocols	• Positioning of finished propellant grains in identified storage facilities. • Periodical rotation of propellant grains, nitrogen purging as per schedule, drying & positioning of silica gel bags (As per storage procedure)

Sl. No.	Operation	Activities involved
		• Periodic inspection of hardware and application / reapplication of protective coatings as per schedule. • Removal of protective coatings in case rust is seen in stored motor hardware's as per procedure & subsequent re-application. • Proper closing of propellant port & ends as per procedure.
18.	Dispatch related activities	• Final weighing of motors/grains before dispatching to user agency. • Pre dispatch inspection of motor/grains prior to dispatch. • Removal of dust & cleaning of port surface. Placement of dried silica gel bags in propellant port as per storage document. • Closing of port and ends by means of adequate covers/sheets. • Loading of motors/grains in explosive truck/trolley/van etc.
19.	UBR test activities	• Receipt & Storage of propellant cartons in Test Rooms/Magazines. • Preparation of UBR test specimens from cartons/EB grains & dimensional inspection of specimens. • Bonding of specimens in test adapters. • Movement of nitrogen gas cylinders from stores to test facility & empty cylinders back to stores. • Assembly, testing, dis-assembly & cleaning during UBR specimen test in test setup. (Min. 5 acceptable specimens from a carton to be tested). • Cleaning of adapters after test.

Sl. No.	Operation	Activities involved
		• Periodical proof pressure testing & maintenance of test setup. • Evaluation of acoustic velocity (2 velocity tests from one carton) from specimens. • Data acquisition during test, retrieval & analysis of UBR data. • Preparation of test report based on test request. • Shifting of remaining/waste propellant to waste storage bay.
20.	Waste propellant /AP disposal	• Disposal of waste propellant / AP material generated during processing at designated facility through open pit burning technique
21.	Documentation	• Recording all the process parameters in process log sheets/log book. • Generation of production document based on log sheet/log book information as well as product evaluation parameters from laboratory / NDT facility.
22.	Quality Control	• Surveillance of all the process operations by qualified engineers/supervisors. • Recording all the quality control parameters in separate log books. • Assessment of in-process checks/ parameters. • Real-time alerting of quality lapses and corrective action.
23.	Non-conformance management	• Any deviations in process / product must be proposed and discussed in the relevant forums / committees in the prescribed format by the CONTRACTOR before further operations.

Sl. No.	Operation	Activities involved
24.	Safety	• Conducting all the process operations, shifting of raw materials, propellant, cast motor/grain etc. as per standard safe procedure. • Provide safety clearances prior to start of various activities. • Deploying qualified safety engineers for surveillance of all the activities. • Ensuring man & material limit for all the activities. • Real-time alerting of safety lapses & generation of safety non-conformance report.
25.	Maintenance of facilities	• Conducting preliminary facility/equipment checks, trial running and recording the parameters as per check list before starting any process operation. • Ensuring valid calibration of equipment / instruments / weighing balances before use. • Real-time communication to DEPARTMENT regarding any equipment failure / break-down. • Housekeeping and floor management in all facilities. • Extending necessary support to DEPARTMENT maintenance team to carry out the routine maintenance / calibration activities.

2.2. Process flow chart

Typical process flow charts describing the overall processing of solid propellant grains is attached as annexure 3. The process flow chart is generic in nature and does not describe the exact process to be followed for each product. Process documents for each product shall be referred for the exact process steps to be followed for each product.

2.3. Standby vehicle

A standby vehicle (5-seater) with driver for any emergency during hazardous activities shall be arranged by the Contractor during the contract period. Cost incurred towards this shall be embedded in the product cost.

2.4. List of PPE's / consumables

A detailed list of personal protective equipment (PPE) and consumables to be arranged by the CONTRACTOR on their own expense for the smooth operation of the contract during the contract period (2 years) is given below. The cost of PPE/consumable shall be embedded in the product cost.

Table 3: List of PPE & other essential consumables (quantity is indicative) required during production activities

Sl. No.	Name of the consumable / PPE	Approx. qty required for 2 years
1.	Chemical resistant nitrile gloves (Solvex 37-676)	2000 pair
2.	Heat resistance gloves	100 pair
3.	PVC gloves	500 pair
4.	Leather gloves for grit blasting	20 pair
5.	Disposable nitrile gloves	10000 pair
6.	Cotton gloves	4000 pair
7.	Cut resistant gloves (Hyflex 11-920)	250 pair
8.	Thick cotton knitted gloves	2000 nos.
9.	Impact resistant safety goggles	200 nos.
10.	Splash goggles	300 nos.

Sl. No.	Name of the consumable / PPE	Approx. qty required for 2 years
11.	Face shield for chemical handling	300 nos.
12.	Half face respirator mask (3M 6000 series)	80 nos.
13.	Full face mask (3M 6800)	80 nos.
14.	Respiratory cartridge (3M 6003 / 6004)	500 nos.
15.	Disposable dust mask (3M 9004IN)	10000 nos.
16.	Heat resistant apron	20 nos.
17.	PVC apron	100 nos.
18.	Reusable coverall (3M 50425)	50 nos.
19.	Safety shoes (slip on type) for explosive area (anti-skid & anti-static) in pair	200 nos.
20.	Safety helmets	60 nos.
21.	Pre filter retainer (3M 5N11)	500 nos.
22.	First aid box	10 nos.
23.	Baniyan waste	1000 kg
24.	Kora cloth	500 kg
25.	Baniyan cloth	500 kg
26.	PTFE coated fiber glass cloth with one side adhesive	2000 sq.m.

Sl. No.	Name of the consumable / PPE	Approx. qty required for 2 years
27.	Tri-chloro ethylene (TCE) – Purity 99.5%, moisture content less than 0.01% maximum	5000 liter
28.	Transparent polythene sheet (1.5m width; 0.15mm thickness)	500 kg
29.	Cotton uniforms without chest pockets	120 set
30.	Cotton overcoats without chest pockets	120 set
31.	Nitrogen gas (99.5% purity, 50-liter cylinders, 150 bar pressure, ISI marked, conforming to IS: 7285 (Part 2) 2004)	2000 nos.
32.	Nitrogen gas (99.9% purity, 50-liter cylinders, 150 bar pressure, ISI marked, conforming to IS: 7285 (Part 2) 2004)	1100 nos.

2.5. Minimum crew size for critical operations / activities

Based on the defined process (as per approved process document) for the processing of solid propellant grains, the minimum crew size required for various critical operation / activity, is given below. This requirement is mandatory for ensuring safety & quality during the operation / activity and must not be compromised under any circumstance. Since many of the operations will be happening in series or parallel mode as per schedule requirement, this is not a basis for calculating the total manpower for GOCO team.

Table 4: Minimum crew size for critical operations / activities

Sl. No.	Critical operation	Minimum crew size		
		Engineer	Supervisor	(Technician / skilled)
1.	Rubber mixing	-	1	2
2.	Grit blasting of hardware	-	1	2
3.	Rubber lining of PS0M-XL HES, MS & NES	-	1	6
4.	Liner application of PS0M-XL HES, MS & NES	1	1	3
5.	Grinding of ammonium perchlorate	-	1	4
6.	Blending of ammonium perchlorate	1	1	4
7.	Weighing operations for propellant raw materials	-	1	3
8.	Raw material receipt, inspection, charging to horizontal kneaders	1	1	6
9.	Propellant unloading, weighing, shifting, loading to kneader for final mixing, sealing	1	1	7
10.	Feed lines cleaning & assembly, vibro sieve cleaning & assembly	1	1	6
11.	Operation of vertical mixer	1	2	8

Sl. No.	Critical operation	Minimum crew size		
		Engineer	Supervisor	(Technician / skilled)
12.	Operation of horizontal mixer	1	1	7
13.	Operations related to casting of PS0M-XL segments	1	1	5
14.	Operations related to casting of SPMs / igniters	1	1	9
15.	Bowl cleaning operations	1	1	9
16.	De-coring of mandrel	-	1	3
17.	UBR test activities	1	1	3
18.	Propellant trimming / LF filling / inhibition of PS0M-XL segments	-	1	4
19.	IR-1 raw premix preparation	-	1	3
20.	Propellant trimming & inhibition of SPMs	-	1	3
21.	SPM / igniter grain movement	-	1	2
22.	Storage protocol activities	-	1	3
23.	Dispatch related activities of PS0M-XL segments	-	1	2
24.	Dispatch related activities of SPMs / igniters	-	1	2

Sl. No.	Critical operation	Minimum crew size		
		Engineer	Supervisor	(Technician / skilled)
25.	Disposal of waste propellant and other material through pit burning	1	-	2

2.6. Production under trial phase

The products and their quantity to be considered under the trial phase of production is listed in table 5.

Table 5: Products and quantity considered under trial phase of production

Sl. No.	Category	Item	Quantity considered under trial phase
1.	1m class propellant grains	PS0M-XL HES	6 nos. (2 nos. each)
		PS0M-XL MS	
		PS0M-XL NES	
2.	Special purpose motors (pressure casting)	RS1 motor	1 batch (any)
		RS2 motor	
3.	Special purpose motors (vacuum casting)	Ullage motors	1 batch
4.	Large igniters	S200 main igniter	1 batch (any)
		S139 main igniter	
5.	Small igniters	S139 / S200 secondary igniter	1 batch (any)
		HPS3 igniter	

Sl. No.	Category	Item	Quantity considered under trial phase
		PS0M-XL type II igniter	
7.	UBR testing	-	20 nos. (any)

2.7. Variation in production quantity

Even though Department will take all efforts to ensure production of the full quantity during the contract period, CONTRACTOR can expect a variation of up to ±20% in production quantity due to unforeseen reasons such as increase / decrease in the demand for each product. In case of increase in demand for production of a product beyond the quantity mentioned in this document, unit rate of each product will be considered for payment. The total PO value will be considered as a financial ceiling and any quantity of identified products or additional products (refer section 2.8 in annexure 1) may be produced by the CONTRACTOR based on the requirement projected by CMC during the contract period.

2.8. Unit cost of each product

Total purchase order value (inclusive of all costs incurred by the Contractor, including human resources, PPE/consumables, standby vehicle, administrative expenses, if any etc. for executing the contract during the period of contract) is taken as the reference for calculating unit cost for each product. This shall be populated in the price bid template. Following tables lists the unit cost of each product as a share of the total purchase order value / total bidding cost:

Table 6: Unit cost of each product (as % share of PO value)

Sl. No.	Name of the product	Unit	Unit cost (% of total PO value)	Quantity (nos.)	Total cost (% of total PO value)
1.	PS0M-XL HES	Nos.	1.08%	20	21.6%

Sl. No.	Name of the product	Unit	Unit cost (% of total PO value)	Quantity (nos.)	Total cost (% of total PO value)
2.	PS0M-XL MS	Nos.	1.20%	20	24.0%
3.	PS0M-XL NES	Nos.	1.56%	20	31.2%
4.	RS1 motor grain	Nos.	0.06%	108	6.48%
5.	RS2 motor grain	Nos.	0.05%	72	3.6%
6.	Ullage motor grain	Nos.	0.05%	54	2.7%
7.	S200 main igniter	Nos.	0.11%	12	1.32%
8.	S139 main igniter	Nos.	0.09%	18	1.62%
9.	S139/ S200 secondary igniter	Nos.	0.06%	36	2.16%
10.	HPS3 igniter	Nos.	0.05%	16	0.8%
11.	PS0M-XL type II igniter	Nos.	0.03%	48	1.44%
12.	UBR testing	Nos.	0.002%	3000	3.15%
Total					**100%**

In addition to the above identified products, if any additional product of similar nature is required to be produced by the GOCO team, those products will be categorised and unit cost is defined as per the following table:

Table 7: Unit cost of additional products (if any)

Sl. No.	Categories of products	Unit cost (% of total PO value)
1.	100 - 200mm diameter class, free standing solid propellant grains	0.05%
2.	Small igniters	0.05%
3.	100 - 200mm diameter class, solid motors with case bonded grains	0.15%
4.	Large igniters	0.10%
5.	300 - 600mm diameter class, case bonded solid propellant grains	0.50%
6.	700 - 1000mm diameter class, case bonded solid propellant grains	1.00%

The final decision on product categorisation in the event of processing a new product will be under the scope of CMC.

2.9. Stage wise cost of each product

Due to the long processing lead times, stage wise costing is calculated for some of the products. For ‘UBR testing’, stage wise costing is not applicable. Table 10 lists formula for calculating stage wise processing cost of each product as a share of the unit cost for each product:

Table 8: Stage wise cost of products (propellant grain for solid motor)

Sl. No.	Name of the product	Stage wise cost as % of unit cost		
		Hardware cleaning to autoclaving	**Abrasion to de-coring**	**Propellant trimming to despatch**
1.	PS0M-XL HES	12%	59%	29%
2.	PS0M-XL MS	14%	59%	27%
3.	PS0M-XL NES	38%	42%	20%
4.	RS1 motor	22%	55%	23%
5.	RS2 motor	22%	55%	23%
6.	Ullage motor	32%	35%	33%
7.	S200 main igniter	-	70%	30%
8.	S139 main igniter	-	70%	30%
9.	S139/ S200 secondary igniter	-	70%	30%
10.	HPS3 igniter	-	70%	30%
11.	PS0M-XL type II igniter	-	70%	30%
12.	100 - 200mm class case bonded solid propellant grains	25%	50%	25%

Sl. No.	Name of the product	Stage wise cost as % of unit cost		
		Hardware cleaning to autoclaving	**Abrasion to de-coring**	**Propellant trimming to despatch**
13.	300 - 600mm class case bonded solid propellant grains	40%	40%	20%
14.	700 - 1000mm class case bonded solid propellant grains	40%	40%	20%

Annexure-2

List of Facilities, tools, machines, equipment, fixtures, utilities and raw materials, routine up keeping

1. Facilities and equipment

To carry out the processing of solid propellant grains following major facilities & equipment (under VSSC scope) are required:

i. Rubber mixing equipment (2-roll mill / internal mixer / kneader)
ii. Rheometer
iii. Calendaring machine
iv. Weighing balances
v. Autoclave
vi. Hot air ovens
vii. Spray coating equipment
viii. Vibro-sieves
ix. Grinder
x. Blender
xi. Horizontal zigma mixer
xii. Vertical mixer
xiii. Casting chamber
xiv. Vacuum pump
xv. Pressure casting setup
xvi. Ultrasonic burn rate testing equipment
xvii. Various facilities with utility support & hoisting (crane) arrangements
xviii. Fixture for holding the propellant for Inhibition
xix. Basic hand tools
xx. Non-sparking tools

2. Raw materials

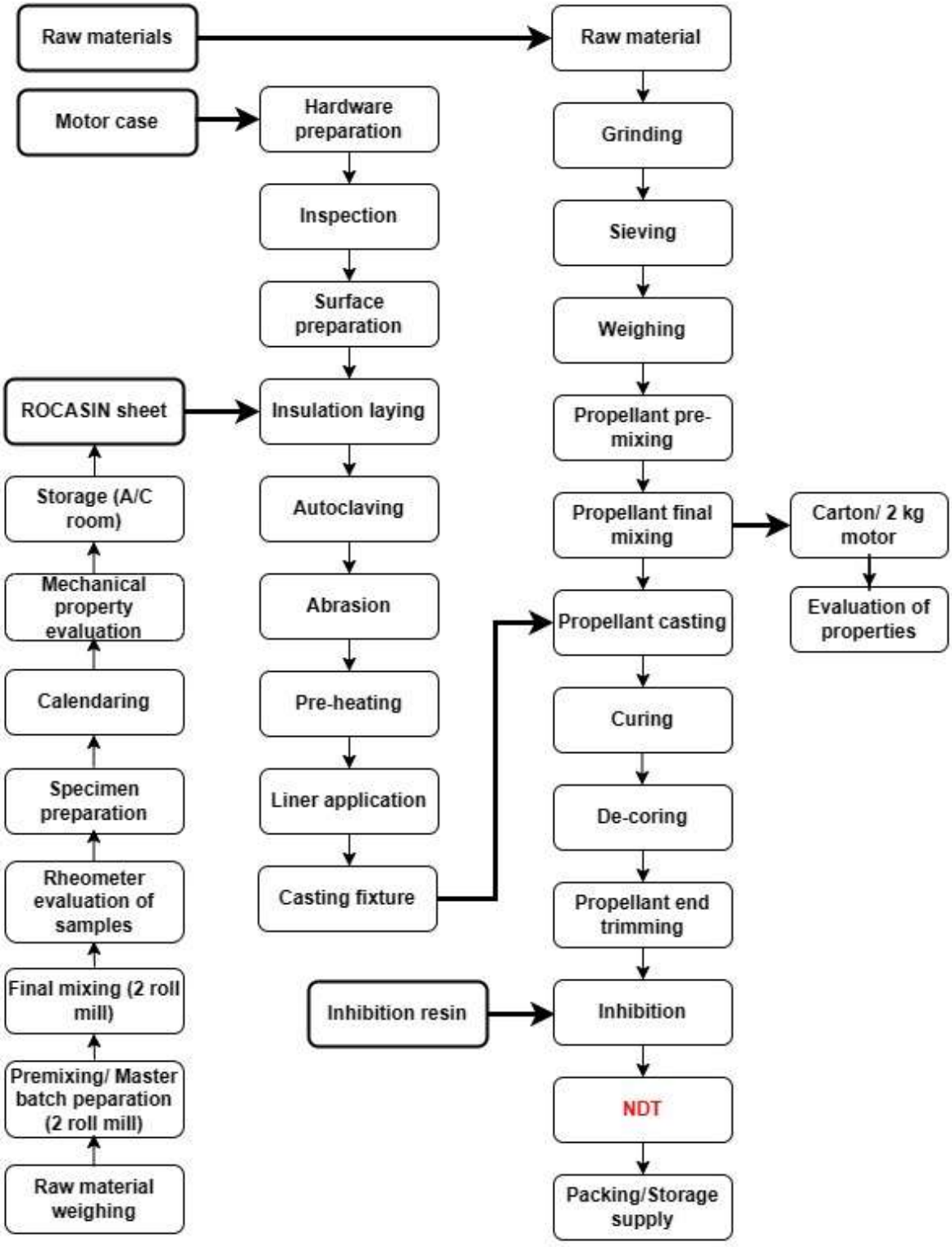
Basic raw materials required for processing of solid propellant grains (under the scope of VSSC) is listed below:

i. ROCASIN

ii. Raw materials for production of ROCASIN
iii. Ammonium perchlorate
iv. Aluminium powder
v. HTPB
vi. TDI
vii. DOA
viii. IDP
ix. ACR
x. MEK
xi. Toluene
xii. Chemlok-205
xiii. Ambilink
xiv. PBNA
xv. Raw materials for production of inhibition resin
xvi. Raw materials for production of epoxy resin
xvii. Silica gel
xviii. Clay putty
xix. Neoprene gasket
xx. Silicone oil
xxi. Aluminium foil
xxii. Profeel sheet
xxiii. Velostat sheet

Annexure 3.

Process flow chart, schedule, QC and safety procedure to be followed



Penalty for safety non-compliances

For any safety non-compliances by the GOCO team or Contractor, penalty as per table 1 will be deducted from the payment based upon the decisions by CMC.

Table 9: Penalty for safety non-compliances

Sl. No.	Type of Safety Non-Compliances	Penalty
1.	Non-use PPE like Helmet / Safety shoes etc.	Rs.250 / day / item / person
2.	Non usage of proper tools for the intended operations	Rs. 1000/ per case per day
3.	Not following operating procedure/ work instructions/ safety instructions	Rs. 1000/- per occasion
4.	Carrying out unauthorized operation/work	Rs. 5000/ per occasion
5.	Non- reporting of near miss incident/ cases of injury	Rs. 5000/- per occasion
6.	Over speeding/ rash driving	Rs. 500/- per Occasion

Annexure-4

Process Team

Contractor should deploy a team (directly employed under the Contractor) of **60 personnel (minimum strength)** in VSSC before the start of production. This team is inclusive of Manager, Engineers, Supervisors, Technicians and Skilled Workers. Only Indian citizens shall be engaged as employees by Contractor. This team should be retained by the contractor in VSSC till the end of the contract period except during a production call-off period.

Table 10: Prerequisites, qualifications & strength of GOCO team

Category	Qualification (Minimum)	Minimum strength, no.	Nature of work	Minimum Experience
Manager	Graduate in Mechanical / Chemical Engineering	1	▪ Contract Manager (focal point)	5 years industry experience
Process Engineer	Graduate in Mechanical / Chemical Engineering	4	▪ Work planning as per schedule ▪ Overall supervision of process and safety	1-year experience in propellant / explosive / chemical industry
Quality Engineer	Graduate in Mechanical / Chemical Engineering	1	▪ Quality Control ▪ Documentation ▪ Non-conformance management	1-year experience in propellant / explosive / chemical industry
Safety Engineer	Graduate / Post Graduate in Safety and Fire / Industrial	2	▪ Safety management ▪ Safety clearance prior to start of operations ▪ Safety inspection ▪ Safety surveillance	1-year in propellant / explosive processing / handling field

Category	Qualification (Minimum)	Minimum strength, no.	Nature of work	Minimum Experience
	Safety Engineering or equivalent		▪ PPE stock maintenance and distribution	
Process supervisor	Diploma in Mechanical / Chemical Engineering	6	▪ Individual process supervision, logging, quality control etc.	1 year in propellant / explosive / chemical industry
Quality supervisor	Diploma in Mechanical / Chemical Engineering	1	▪ Quality surveillance during each process ▪ Documentation	1 year in propellant / explosive / chemical industry
Skilled Workers *(Special category for highly specialized skills)*	8th pass	9	▪ Rubber compounding ▪ Rubber sheet calendaring ▪ Grit blasting ▪ Rubber lining ▪ Spray / brush coating	▪ 2 years in rubber processing (rubber mixing & rubber lining) field for 8 personnel ▪ 2 years in grit blasting for 1 personnel *(Work is physically very demanding)*
Technician	ITI fitter / Chemical plant operation / lab technician	36	▪ Carrying out the process as per guidelines of supervisor/engineer	1-year experience in propellant / explosive / chemical industry is highly desirable

To ensure a healthy balance of skill set, minimum 30% of process engineers and process supervisors shall be from either mechanical or chemical engineering background.

Annexure 5

Price Variation Formula as per GFR 2017

APPENDIX-11

$$P1 = P0\left[F + a\left[\frac{M1}{M0}\right] + b\left[\frac{L1}{L0}\right]\right] - P0$$

P1: Adjustment amount payable to the supplier (a minus figure will indicate a reduction in the contract price)

P0: is the contract price at the base level

F: is the fixed element not subject to price variation

a: is the assigned percentage to the material element in the contract price

b: is the assigned percentage to the labour element in the contract price

L0 & L1 are the wage indices at the base month & year and at the month and year of calculation respectively

M0 & M1 are the material indices at the base month and year and at the month and year of calculation respectively

Base month: Month of release of PO / commencement of activity whichever is later

Note:

1) The price variation will be applicable, if the resultant change is higher than 2 % of previous unit price (from base for third year and from third year for fourth year). Where resultant price increase is less than 2%, no price adjustment will be made to the contractor.

2) If there is any reduction in price as result of price variation, same shall be passed on to Department