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INVITATION FOR EXPRESSION OF INTEREST (EoI) FOR PROCUREMENT OF AUXILIARY POWER UNIT (APU) FOR TANK T-72 AND T-90

References : DPP 2016.

Appendices :

Appendix A : Appreciated Timelines & Milestones for Auxiliary Power Unit (APU) for Tank T-72 and T-90.

Appendix B: Preliminary Service Qualitative Requirements (PSQR) for Auxiliary Power Unit (APU) for Tank T-72 and T-90.

Appendix C : Commercial Evaluation Criteria.

Appendix D : Technical Evaluation Criteria.

Appendix E : Information Performa.

Appendix F : Confidentiality Agreement.

Appendix G : Correctness Certificate.

Annexure (s): Technical Evaluation Compliance Matrix (**Annexure 'I' to Appendix 'D'**)

Introduction

1. The Auxiliary Power Unit (APU) is an alternate source of power for the Fire Control System of the Tank and ancillaries, to cater for power requirements during lull in the battle, while deployed in surveillance mode and during training, with a view to conserve the life of main engine of the Tank. There is a requirement to indigenously develop an APU for both T-72 as well as T-90 Tank in service in the Indian Army. Auxiliary Power Unit for Tank T-72 and T-90 has been identified as a 'Make II' project under the 'Make in India' initiative of the Govt.

Objective

2. The objective of this invitation of Expression of Interest (EoI) is to **seek responses from eligible Indian Vendors for development of prototype and further procurement of Auxiliary Power Unit (APU) for Tank T-72 and T-90** in service in the Indian Army.

Layout

3. The EoI has been covered under the following parts:-

- (a) Part I : General Information.
- (b) Part II : Scope of the Project.
- (c) Part III : Evaluation Criteria.
- (d) Part IV : Procedure for Submission of Response to the EoI.
- (e) Part V : Miscellaneous Aspects.

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4. The nodal officer for this project for all queries/clarifications/coordination will be **Secretary, Project Facilitation Team (PFT), Project 'Auxiliary Power Unit (APU) for Tank T-72 and T-90'**. Address and contact details of the nodal officer are given at Paragraph 30 of the EoI.

PART I: GENERAL INFORMATION

5. **Categorisation**. The project is categorised as under:-

(a) **Prototype Development Phase**. 'Make-II' in accordance with Para 6 of Chapter III-A of DPP-2016.

(b) **Procurement Phase**. 'Buy (Indian - IDDM)' with minimum 40% IC in accordance with Para 5 of Chapter III-A of DPP-2016.

6. **Quantities**. The quantities sought for the project are:-

(a) **Prototype Development Phase**. Four Prototype Auxiliary Power Units to be developed by the shortlisted DA(s). Two each for T-72 and T-90 Tank.

(b) **Procurement Phase**. Procurement of quantity 3257 Auxiliary Power Units (APU) (Quantity 1657 for T-90 Tank and quantity 1600 for T-72 Tank), including ESP and fitment on tanks.

7. **Appreciated Timelines & Milestones**. Appreciated timelines & milestones for the project are given at **Appendix 'A'**.

PART II : SCOPE OF THE PROJECT

Proposed Auxiliary Power Unit (APU) for Tank T-72 and T-90

8. T-72 and T-90 Tanks are the mainstay of the Mechanised Forces. The Auxiliary Power Unit (APU) is an alternate source of power for the Fire Control System of the Tank and ancillaries, to cater for power requirements, while deployed in surveillance mode during a lull in battle, and during training, with a view to conserve the life of main engine of the Tank. Presently the main engine in both T-72 and T-90 Tanks, needs to keep running, to operate Fire Control System of the Tank and ancillaries, while deployed in surveillance mode. Regular running of the main engine of tank for above mentioned purposes reduces the life of main engine. To conserve the life of main engine of the tank, it is imperative to indigenously develop and install an APU on the in-service T-72 and T-90 Tanks, and those being mfr by OFB.

9. **Preliminary Service Qualitative Requirements (PSQR) of the Proposed APU**. PSQR No P-66 of the **Auxiliary Power Unit (APU) for Tank T-72 and T-90** is attached as **Appendix 'B'**.

Timelines and Critical Activities

10. Stages of the development and procurement process will be as per Chapter III-A of DPP-2016.
11. Major critical activities in the procurement process areas given below:-

<u>Serial No</u>	<u>Activity</u>	<u>Remarks</u>
(a)	Pre Expression of Interest (Eol) Response Meeting	3 Weeks (tentative) after the issue of Eol, to clarify the issues/ queries raised by participating firms to facilitate submission of Eol response.
(b)	Evaluation of Eol Responses	By Project Facilitation Team (PFT).
(c)	Issue of Project Sanction Order for Development of Prototype	To shortlisted Development Agencies (DAs) meeting evaluation criteria.
(d)	User Trial Readiness Review	(a) To confirm completion of design & development of prototypes as per PSQR, prior to commencement of User Trials. (b) More than one review may be conducted, on required basis. Dates will be promulgated by the PFT, as per progress of the project.
(e)	Solicitation of Commercial Offers	Commercial RFP for 'Buy (Indian-IDDM)' phase will be issued to all Development Agencies (DAs) for submission of their commercial offer, prior to commencement of User trials.
(f)	Conduct of User Trials and GS Evaluation	To validate the performance of the Auxiliary Power Unit (APU) equipment under trial against the specifications approved after the development of prototype.

Development of Prototype and Trials

12. The composition and design of the **Auxiliary Power Unit (APU) for Tank T-72 and T-90** to meet the PSQR will be decided by respective DAs in conformity with Para 11 above. Any clarification related to functional or operational aspects of the equipment under development, as sought by the DAs, will be provided by the Project Facilitation Team (PFT).

13. After the prototype has been developed as per PSQR given at **Appendix 'B'**, the PFT will carry out User Trial Readiness Review of the prototype(s) and freezing of Technical Specifications, before conduct of User Trials. Evaluation of **Auxiliary Power Unit (APU) for Tank T-72 and T-90** will be carried out during the User Trials, to validate the performance of the APUs against the Final Technical Specifications. **The SHQ will formulate the 'Trial Directive' which will address all issues for validating the 'Essential Parameters'**. Necessary technical literature pertaining to the design & material will be provided by the DAs for the User Trial Readiness Review and conduct of User Trials on the prototype.

14. Access to in-service **Tank T-72 and T-90**, as feasible, will be provided to the selected DAs, for internal assessment of parameters given in the PSQR.

Solicitation of Commercial Offers

15. A commercial Request for Proposal (RFP) for 'Buy (Indian-IDDMM)' phase would be issued to DA(s) prior to commencement of User trials for soliciting their commercial offers and additional technical information/ documentation, as may be necessary.

Deliverables

16. The deliverables are as under: -

(a) **Prototype Development Phase.** Four Prototype Auxiliary Power Units. Two each for T-72 and T-90 tank, to be developed by each nominated DAs.

(b) **Procurement Phase.** Procurement of quantity 3257 Auxiliary Power Units (APU) (Quantity 1657 for T-90 Tank and quantity 1600 for T-72 Tank), including ESP and fitment on tanks.

(c) ESP to incl MRLS, SMT/STE etc.

(d) **Packaging**

(i) Packaging box should be sufficiently strong and of seasoned wood to ensure that safety during transportation.

(ii) Suitable markings on boxes.

(iii) The boxes should be provided with adequate facility for carriage.

List of Trials/ facilities to be provided

17. The following trials/facilities will be provided : -

(a) **Trials.** The trials will be conducted in three Phases: -

(i) **Phase – I : Developmental Trials.** Development of prototype and bring the Auxiliary Power Unit to user trial level and ensure that the equipment meets the desired parameters and safety standards. The development trial will be carried out in two stages:-

(aa) **Stage-I.** On bench test.

(ab) **Stage -II.** Trial on T-90 and T-72 tanks.

(ii) **Phase – II : DGQA Evaluation Trial.** To evaluate the performance & access the suitability of Auxiliary Power Unit to meet functional and safety requirements.

(iii) **Phase – III :User Trials (Summer and Winter Trial).** To evaluate indigenously developed Auxiliary Power Unit for tank T-72 and T-90 and ascertain its suitability for induction in the Army.

(b) **Safety Certificate.** Manufacture will give a safety certificate before the commencement of trials. Stating the following: -

“Auxiliary Power Unit being offered to the Army for trials has been validated during Internal Validation Trials by manufacturer for safety. All the safety parameters are well within the design parameters, and this Auxiliary Power Unit is safe for the Trial by the Crew”.

(c) **Facilities Provided.**

(i) **Trials Tanks.** 01 x tank each of T-72 and T-90 in physically fit condition for user trial and facilities at HVF, Avadi to meet functional and safety requirements as per **Gol, Ministry of Defence vide letter No 18(2)/15/GTF/DP(Plg-MS) dated 28 August 2019.** A fitness certificate will be submitted by the DAs on maintainability of tanks.

(ii) **Trial Crew.** Crew on the trials tanks will be provided. Necessary training on the operation of Auxiliary Power Unit for the crew will be conducted by the DAs. A crew training certificate will be submitted by the DAs on the training standard of the crew.

(iii) In case if any damage occurs to the **equipment / property / personnels resulting from the testing of the job of private entity, the private entity is liable to bear the expenses** of repair / replacement of the facility and all necessary insurance coverage for the job shall be the responsibility of the private entity.

(iv) **Repair, Recovery and Maintenance Facility.** Necessary repair cover will be provided.

Multiple Technological Solutions

19. Multiple technological solutions for the Auxiliary Power Unit for T-72 and T-90 tanks **will not be acceptable.**

Intellectual Property Rights (IPRs)

20. Policy on IPRs is, as given at Paragraph 42 of Chapter III-A of DPP-2016. The vendor will submit an **IPR certificate** stating that the **“Design of the equipment is the property of the vendor”**.

PART III : EVALUATION CRITERIA

Commercial Evaluation Criteria

21. The Indian entity meeting the criteria given at Annexure I of the Make-II Procedure will be considered as an eligible “Indian Vendor” for the project. EoI respondents will furnish their response to the Commercial Evaluation Criteria, as per **Appendix ‘C’**.

Technical Evaluation Criteria

22. The respondents to this EoI are required to furnish information about their Technical Capability as per **Appendix ‘D’**. Compliance/ information as per **Annexure I to Appendix ‘D’** is also required to be submitted as per the proposed solution offered by the DA against PSQR of the APU. Evaluation criteria for Desirable/Enhanced Performance Parameters is as per **Annexure II to Appendix ‘D’**

23. **Indigenous Content**. Post successful development of prototype(s), further procurement will be as per the ‘Buy (Indian-IDD) procedure with a **minimum of 40% Indigenous Content as per DPP-2016**.

24. **Foreign Collaboration**. If the DA is collaborating/ plans to collaborate with a foreign technology provider, the nature of such collaboration and the technology areas being transferred must be stated in the response (please refer Paragraphs 12 & 13 of **Appendix ‘E’**).

25. **Additional Information**. Additional information required to be furnished as part of the EoI response is also given at **Appendix ‘E’**.

PART IV : PROCEDURE FOR SUBMISSION OF RESPONSE TO THE EoI

26. The response to the EoI shall be submitted as per formats given at **Appendices ‘C’, ‘D’ and ‘E’**.

27. **Guidelines for Submitting EoI Responses**.

(a) The responses should be submitted strictly as per the formats given in respective Appendices. Should a vendor need to mention any other information, a separate column/ row may be added.

(b) All responses and Appendices should be submitted in a single file/ folder. Supporting documents/ additional references should be submitted in a separate folder, with proper references mentioned against each parameter/ sub parameter, in respective appendices.

(c) Any supporting document/ evidence without any reference to specific parameter of criteria will not form part of the assessment.

28. **Rejection Criteria for the Responses.** The following may lead to rejection of the Eol response:-

- (a) Failure to meet Commercial Evaluation Criteria given at **Annexure I of Appendix 'C'**.
- (b) Failure to meet/ comply with the Technical Evaluation Criteria Specifications give at **Appendix 'D'**.
- (c) Failure to offer compliance to any of the terms and conditions given in the Eol.
- (d) Any other parameter of the response considered inadequate by the MoD, Government of India.

29. The Eol respondent shall submit three (03) copies of response to the Eol, clearly marking one copy as '**Original Copy**' and second and third as '**Duplicate Copy and Triplicate Copy**'. In the event of any discrepancy between them, the original copy shall govern/ prevail. Each page of the response will bear the signatures of the authorised signatory of the company. The DA shall also submit a soft copy of the response to this Eol in a CD/ DVD.

30. The envelopes shall be addressed as under:-

Secretary, Project Facilitation Team
'Auxiliary Power Unit (APU) for Tank T-72 and T-90'
General Staff Branch
Directorate General of Mechanised Forces
Integrated HQ of MoD (Army)
Room Number 501
'A' Wing, Sena Bhawan
DHQ PO, New Delhi-110011
Tele : 233-35094 / 23011655
Email : dcat.modac90@gov.in

31. The response to this Eol must be submitted by **1500 hours on 04 Mar 2020** at the address mentioned above.

32. The Company will be required to sign and honour the 'Confidentiality Agreement' with MoD, Govt of India. The 'Confidentiality Agreement' will be furnished by each Eol respondent at the time of submission of Eol responses, as per format given at **Appendix 'F'**.

PART V : MISCELLANEOUS ISSUES

33. **Pre Eol Response Meeting.** Companies may submit written queries/ clarifications/ amplifications on specific issues within 10 days of the issue of Eol. A pre-response meeting will be held within three weeks (tentative) after the issue of Eol, to clarify the issues / queries raised by the participating firms to facilitate submission of response. Date of pre-response meeting will be promulgated by the PFT.
34. Guidelines for penalties in business dealings with entities as promulgated by the Government of India, from time to time, will be applicable on procurement process and bidders.
35. The Pre-contract Integrity Pact (PCIP), listed as detailed in Paragraph 92 of Chapter II of DPP 2016, shall apply mutatis mutandis, to 'Buy (Indian-IDDM)' phase of 'Make' project.
36. Respondents would be subject to disqualification if they make false, incorrect, or misleading claims in their response to this Eol. A 'Correctness Certificate' as per the format at **Appendix 'G'** will be furnished as part of the response.
37. Please acknowledge the receipt of this invitation for Eol.

File No:A/35854/Make(APU)/GS MoD (AC)/2020

Dated: Jan 2020

(Ajay Tripathi)

Colonel

Member Secretary, Project

Facilitation Team Project 'Auxiliary

Power Unit (APU) for Tank T-72 and T-90'

Enclosures : **Appendices A to G**

Distribution List with Copy Nos

For Vendors

- Copy No 01 to 17.

Office Copy

- Copy No 18.

APPRECIATED TIMELINES & MILESTONES FOR MAKE-II PROJ
"AUXILIARY POWER UNIT (APU) FOR TANK T-72 AND T-90"

<u>Sr. No</u>	<u>Milestones/Activity</u>	<u>Time in weeks from collegiate discussions (T₀)</u>
1.	Categorisation and Accord of AoN	T ₀
2.	Issue of Eol	8
3.	Eol Response Submission	6
4.	Eol Response Evaluation	5
5.	Issue of Project Sanction Order	2
6.	Design & Development of Prototype	78 (As per AoN)
7.	Conversion of PSQR to SQRs/ Solicitation of Commercial Offer	4
8.	User Trials & Staff Evaluation	8-26
	Total	111-137 weeks

**PRELIMINARY STAFF QUALITATIVE REQUIREMENT (PSQR) FOR AUXILIARY
POWER UNIT (APU) FOR TANK T-72 AND T-90**

PART I - ESSENTIAL CHARACTERISTICS

Physical Characteristics

1. The physical characteristics are as under:-

<u>Parameters</u>	<u>Specifications</u>
Size and Shape	The system should be modular . The existing fitment items in the crew compartment should not be removed, however if relocated, they should not compromise the operation of relocated fitment items of the tank. The system should not change the overall silhouette of the tk, when viewed from the front.
Life	The APU should be designed to last for Minimum 2000 Engine Hours for which vendor should provide a certificate.
EMI/EMC	The system should meet the MIL 461 E Standards (as applicable for ground forces) with regard to EMI/EM Compatibility .
Power Output	Not less than 13 KW at 27.5 ±1V DC . The system should be compatible with MIL STD 1275 E
Weight	The overall weight of the APU including casing and all accessories should not exceed 500 Kgs .
Protection	The outer casing of the APU should have STANAG Level-3 protection.

Operational Characteristics

2. The operational characteristics are as under:-

<u>Parameters</u>	<u>Specifications</u>
Design Parameters	The system should not foul with existing features of the tank (hinder movement of gun during manual mode or in stabilised mode, or involve relocation of ammunition).
Design Parameters	Cutting of armour is not permitted, and drilling if resorted to, should not be in the frontal 60⁰ arc of the tank . It should not compromise the Overpressure System and the NBC Protection System of the tank
Temp	The system should be able to operate with a minimum Power Output of 13 KW in an ambient temperature range between min from -15⁰ C to -5⁰ C (at altitudes of 16000 ft) and maximum from 40⁰ C to 45⁰ C . Suitable Cold Starting arrangement should be incorporated for operations at low temperatures.
Auxiliary Power Unit (APU)	APU should be able to concurrently operate the following systems of the tank in silent mode (Main Engine of the tank switched off) for at least Six Hours :- (i) Gunner, Commander and Driver Sights (Day & Ni). (ii) Fire Control System. (iii) Stabiliser System. (iv) Radio Sets. (v) Inter Communication System/ Digital Control Harness. (vi) Charging of Batteries. (vii) Navigation Aid Equipment.

<u>Parameters</u>	<u>Specifications</u>
APU	APU should be able to operate the above mentioned systems of the tank for not less than six hours followed by a rest of 30 minutes and again an operation of not less than six hours.
APU	The APU should be <u>modular</u> and mounted outside but not on the turret. It should be capable of being installed in the field and it should comply with the following:- (i) It should not reduce existing obstacle crossing capability of the tank. (ii) It should not reduce the ground clearance of the tank. (iii) It should not foul with the azimuth and vertical movement of gun tube and turret. (iv) It should not foul with ground/trailer while mounting/ dismounting and lashing the tank on a tank transporter and on MBFU/MBWT.
FOL	<u>Fuel.</u> The APU should be capable of operating on existing fuel grade used in the tank (to be drawn from the existing fuel system of the tank). <u>Oils and Lubricants.</u> The oils and lubricants used should be commercially available in India.
APU	Should provide at least two spare power output jacks to facilitate connection of additional equipment that may be installed on the tank after the APU has been fitted.
APU	The APU should have an inbuilt overload, over voltage, under voltage and short circuit protection system.
Noise Level	Maximum noise level should not exceed 75 decibel at a distance of one metre from the APU.
APU	The starting push button/switch should automatically disengage once the APU is started, to avoid burn out of the self-starter, since the driver will not be able to hear the APU when he is wearing a Radio Head set.
APU	The APU should have a standby starting system apart from the main starting system ie it should be able to be started by external power source, example another APU/tank.
APU	The APU should be capable of being replaced and reinstalled in field after initial fitment on the tank.

<u>Parameters</u>	<u>Specifications</u>
APU	The APU should provide access to the user to enable checking of oil/lubricant level prior to operation and during periodic maintenance by user i.e. during oil changes and cleaning / replacing of filters.
APU	The APU with the outer casing should comprise of sealed units, and be water proof upto a depth of five meters with requisite preparation , while the tank is carrying out deep fording.
Test Standards	The system should withstand the environment and durability tests of JSS-55555, as applicable.
Control Panel.	<p>The system should have a digital display panel for engine hour reading and warning lights. It should be located in the driver's compartment. Following indication and protection arrangements should be incorporated in the control panel :-</p> <ul style="list-style-type: none">(i) Input over-voltage indication & protection.(ii) Short circuit indication & protection.(iii) Reverse polarity indication & protection.(iv) Over temp indication & protection.(v) Diagnostic and health monitoring system should be integrated with gauges in the driver's compartment.
APU	The engine should be of the type approved with emission controlled, as per latest Central Pollution Control Board norms.

Maintenance Aspects

3. The maintenance aspects are as under:-

<u>Parameters</u>	<u>Specification</u>
Reliability	The system should be highly reliable and have a Mean Time Between Failure (MTBF) of not less than 500 hours . A vendor certificate for the same should be provided.
<u>Maintainability</u>	The systems should have a Built-in Test Equipment facility to isolate a defect that has occurred in the system and Mean Time To Repair (MTTR) should not exceed six hours . A vendor certificate for the same should be provided. In addition the following should be incorporated in the system :- (i) The APU System should have adequate test/inspection points/lights and built in gauges for checking performance/fault findings. (ii) Routing/fitment of various assemblies, wires and pipes should be such that it facilitates maintenance /repair . (iii) There should be no requirement of removal of whole APU for servicing / repair / maintenance / replacement of minor assemblies.
Durability	The system should provide for a minimum Mean Time Between Overhaul (MTBO) of 1000 hours for APU for which vendor will give a certificate.
Engineering Support.	The system should be capable of being repaired during its specified life for which requisite Engineering Support should be catered for.

PART II – DESIRABLE CHARACTERISTICS

4. The desirable characteristics is summarised as:-

<u>Parameters</u>	<u>Specification</u>
Power Output	The APU should provide a Power Output of 16 KW at 27.5 ±1V DC .
Life	The APU should be designed for a life of minimum 3000 Engine Hours, for which vendor should provide a certificate .

Appendix 'C'

(Refer Para 21 of EoI)

COMMERCIAL EVALUATION CRITERIA

1. **Name of the Vendor** : _____

2. **Evaluation Criteria.**

<u>S No</u>	<u>Criteria</u>	<u>Vendor Submission</u>	<u>Reference</u> (Reference against vendor claim/ response must be flagged and mentioned in this column)	<u>Remarks (if Any)</u>
(a)	Nature of the Company [refer Para 1 (i) of Annexure I of Appendix A of Chapter III-A of DPP-16].			
(b)	Ownership Status [refer Para 1 (ii) of Annexure I of Appendix A of Chapter III-A of DPP-16].			
(c)	Category of Industry (Large/ Medium/ Small/ Micro).			
(d)	Registration Details.			
(e)	Minimum average turnover for last two financial years			
(f)	Present Net Worth.			

Station :

Signature

Company Seal

Date :

Note:-

1. All submissions must be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not be assessed.

TECHNICAL EVALUATION CRITERIA

<u>Ser No</u>	<u>Criteria</u>	<u>Weightage</u>
1.	Any experience in manufacture or collaboration with foreign OEM of complete ammunition/accessories of ammunition including explosives.	Yes/No
2.	Existing ammunition manufacture related infrastructure/R &D/Quality Control Facilities.	Yes/No
3.	Whether holding explosive manufacture license or the same has been applied for from MHA.	Yes/No
4.	Whether the above ammunition being produced by manufacturer/OEM has been certified by any recognised entity/ In-service with any Armed Forces.	Yes/No
5.	Whether the firm possess adequate capability to absorb Transfer of Technology (ToT).	Yes/No

Station :

Signature

Company Seal

Date :

TECHNICAL EVALUATION COMPLIANCE MATRIX

<u>S No</u>	<u>PSQR Requirements</u>	<u>Vendor Claim Value</u>	<u>Remarks</u>
<u>PHYSICAL CHARACTERISTICS</u>			
1.	<u>Size and Shape.</u> The system should be modular. The existing fitment items in the crew compartment should not be removed, however if relocated, they should not compromise the operation of relocated fitment items of the tank. The system should not change the overall silhouette of the tk, when viewed from the front.		
2.	<u>Life.</u> The APU should be designed to last for Minimum 2000 Engine Hours for which vendor should provide a certificate.		
3.	The system should meet the MIL 461 E Standards (as applicable for ground forces) with regard to EMI/EM Compatibility.		
4.	<u>Power Output.</u> Not less than 13 KW at 27.5 ±1V DC. The system should be compatible with MIL STD 1275 E.		
5.	<u>Weight.</u> The overall weight of the APU including casing and all accessories should not exceed 500 Kgs.		
6.	<u>Protection.</u> The outer casing of the APU should have STANAG Level-3 protection.		
<u>OPERATIONAL CHARACTERISTICS</u>			
7.	The system should not foul with existing features of the tank (hinder movement of gun during manual mode or in stabilised mode, or involve relocation of ammunition).		
8.	Cutting of armour is not permitted, and drilling if resorted to, should not be in the frontal 60⁰ arc of the tank. It should not compromise the Overpressure System and the NBC Protection System of the tank.		

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<u>S No</u>	<u>PSQR Requirements</u>	<u>Vendor Claim Value</u>	<u>Remarks</u>
9.	<u>Temp.</u> The system should be able to operate with a Min Power Output of 13 KW in an ambient temperature range between minimum from -15⁰ C to -5⁰ C (at altitudes of 16000 ft) and maximum from 40⁰ C to 45⁰ C. Suitable Cold Starting arrangement should be incorporated for operations at low temperatures.		
10.	<u>Auxiliary Power Unit (APU).</u> APU should be able to concurrently operate the following systems of the tank in silent mode (Main Engine of the tank switched off) for at least Six Hours :-		
	(i) Gunner, Commander and Driver Sights (Day & Ni).		
	(ii) Fire Control System.		
	(iii) Stabiliser System.		
	(iv) Radio Sets.		
	(v) Inter Communication System/ Digital Control Harness.		
	(vi) Charging of Batteries.		
	(vii) Navigation Aid Equipment.		
11.	APU should be able to operate the above mentioned systems of the tank for not less than six hours followed by a rest of 30 minutes and again an operation of not less than six hours.		
12.	The APU should be modular and mounted outside but not on the turret. It should be capable of being installed in the field and it should comply with the following:-		
	(i) It should not reduce existing obstacle crossing capability of the tank.		
	(ii) It should not reduce the ground clearance of the tank.		
	(iii) It should not foul with the azimuth and vertical movement of gun tube and turret.		
	(iv) It should not foul with ground/trailer while mounting/dismounting and lashing the tank on a tank transporter and on MBFU/MBWT.		

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<u>S No</u>	<u>PSQR Requirements</u>	<u>Vendor Claim Value</u>	<u>Remarks</u>
13.	<u>FOL.</u>		
	(i) <u>Fuel.</u> The APU should be capable of operating on existing fuel grade used in the tank (to be drawn from the existing fuel system of the tank).		
	(ii) <u>Oils & Lubricants.</u> The oils and lubricants used should be commercially available in India.		
14.	Should provide at least two spare power output jacks to facilitate connection of additional equipment that may be installed on the tank after the APU has been fitted.		
15.	The APU should have an inbuilt overload, over voltage, under voltage and short circuit protection system.		
16.	Maximum noise level should not exceed 75 decibel at a distance of one metre from the APU.		
17.	The starting push button/switch should automatically disengage once the APU is started, to avoid burn out of the self starter, since the driver will not be able to hear the APU when he is wearing a Radio Head set.		
18.	The APU should have a standby starting system apart from the main starting system ie it should be able to be started by external power source, example another APU/tank.		
19.	The APU should be capable of being replaced and reinstalled in field after initial fitment on the tank.		
20.	The APU should provide access to the user to enable checking of oil/lubricant level prior to operation and during periodic maintenance by user i.e. during oil changes and cleaning / replacing of filters.		
21.	The APU with the outer casing should comprise of sealed units, and be water proof upto a depth of five meters with requisite preparation , while the tank is carrying out deep fording.		
22.	The system should withstand the environment and durability tests of JSS-55555, as applicable.		

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S No	PSQR Requirements	Vendor Claim Value	Remarks
23.	Control Panel. The system should have a digital display panel for engine hour reading and warning lights. It should be located in the driver's compartment. Following indication and protection arrangements should be incorporated in the control panel :-		
	(i) Input over-voltage indication & protection.		
	(ii) Short circuit indication & protection.		
	(iii) Reverse polarity indication & protection.		
	(iv) Over temp indication & protection.		
	(v) Diagnostic and health monitoring system should be integrated with gauges in the driver's compartment		
24.	The engine should be of the type approved with emission controlled, as per latest Central Pollution Control Board norms.		
<u>MAINTENANCE ASPECTS</u>			
25.	Reliability. The system should be highly reliable and have a Mean Time Between Failure (MTBF) of not less than 500 hours. A vendor certificate for the same should be provided.		
26.	Maintainability. The systems should have a Built-in Test Equipment facility to isolate a defect that has occurred in the system and Mean Time To Repair (MTTR) should not exceed six hours. A vendor certificate for the same should be provided. In addition the following should be incorporated in the system :-		
	(i) The APU System should have adequate test/inspection points/lights and built in gauges for checking performance/fault findings.		
	(ii) Routing/fitment of various assembles; wires and pipes should be such that it facilitates maintenance /repair.		
	(iii) There should be no requirement of removal of whole APU for servicing / repair / maintenance / replacement of minor assemblies.		
27.	Durability. The system should provide for a minimum Mean Time Between Overhaul (MTBO) of 1000 hours for APU for which vendor will give a certificate.		

RESTRICTED

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<u>S No</u>	<u>PSQR Requirements</u>	<u>Vendor Claim Value</u>	<u>Remarks</u>
28.	<u>Engineering Support.</u> The system should be capable of being repaired during its specified life for which requisite Engineering Support should be catered for.		
<u>DESIRABLE CHARACTERISTICS</u>			
29.	<u>Power Output.</u> The APU should provide a Power Output of 16 KW at 27.5 +1V DC.		
30.	<u>Life.</u> The APU should be designed to last for minimum 3000 Engine Hours. For which vendor should provide a certificate.		

Station :

Signature

Company Seal

Date :

**EVAL CRITERIA OF DESIRABLE/ENHANCED PERFORMANCE PARAMETERS
(D/EPP) AUXILIARY POWER UNIT (APU) FOR TANK T-72 AND T-90
UNDER MAKE II CAT**

1. **Eval of L1 in case of Desirable/Enhanced Performance Parameters (D/EPP).** D/EPP are those parameters that enhance the capability of the eqpt / product, vis-a-vis the essential parameters. If a vendor claims to have eqpt mtg the D/EPP as specified in SQRs, the same is tested for compliance during the FET itself. D/EPP are as under: -

<u>S No</u>	<u>Specification</u>	<u>Essential Parameters</u>	<u>Desirable/ Enhanced Performance Parameters</u>
(a)	Power Output.	Not less than 13 KW	Not less than 16 KW
(b)	Life.	Minimum 2000 Engine Hours for which vendor should provide a certificate.	Minimum 3000 Engine Hours. For which vendor should provide a certificate.

2. For eval of L1, the credit scores criteria will have an overall effect on the price bid format based on the addl tech score (**Ref DPP Appendix 'O' to Sch I to Chapter II**). To bal cost and the tech parameter, the Credit score for Desirable/Enhanced Performance Parameters will be awarded as under:-

<u>S No</u>	<u>Desirable/ Enhanced Performance Parameters</u>	<u>Credit Score</u>	<u>Value of Commercial Quote(Price Bid Format)</u>
<u>Power Output</u>			
(a)	Not less than 16 KW	3%	'X' cost multiplied by 0.97
<u>Life</u>			
(c)	Minimum 3000 Engine Hours. For which vendor should provide a certificate.	(Since Eval of Parameter is only on vendor certification)	Nil

3. **Parameter : Power Output.** Power Output will be allotted specified credits on achieving higher Power Output than that specified in essential parameters (13 KW). This implies that on successfully achieving an increased Power Output of 16 KW (desirable parameters), the vendor will be allotted credit score of Three percentages (3%). **No credit scores will be allotted for achieving power output between 13 KW and 16KW.**

INFORMATION PROFORMA

1. Name of the Company.
2. Name of CEO with Designation.
3. Address of the Registered Office.
4. Address of the Factory/Factories.
5. Company Website(s).
6. Date of Incorporation.
7. Brief History of the Company.
8. Category of Industry (Large/ Medium/ Small/ Micro).
9. Nature of Company (Public Limited/ Private Limited).
10. Nature of Business (Manufacturer/ Trader/ Sole Selling or Authorised Agent/ Dealer/ Assembler/ Processor/ Re packer/ Service Provider). Please give broad product range as applicable.
11. Details of Current Products:-
 - (a) Type/ Description.
 - (b) Licensed/ Installed Capacity.
 - (c) Annual Production for preceding Three Years.
12. Details of Foreign Collaborations, if any, planned for execution of project.
13. Technology Received from abroad and assimilated/ planned for execution of project.
14. Products Already Supplied:-
 - (a) To Indian Army/Air Force/Navy.
 - (b) PSUs.
 - (c) DRDO and its Laboratories.

- (d) Ordnance Factories.
 - (e) Any other Defence Organisation.
 - (f) To other Principal Customers.
15. Details of Developmental Facilities:-
- (a) R&D Facilities Available.
 - (b) Number of Technical Manpower.
 - (c) Percentage of Total Turn-Over Spent on R&D during the Last Three Years.
16. Turn-over during the last Three Financial Years.
17. Any other relevant information.
18. Contact Details of the Executive nominated to co-ordinate with the Assessment Team (please provide telephone, mobile and e-mail address).

CONFIDENTIALITY AGREEMENT

The company understands the security sensitivity of operational equipment. No information pertaining to deployment and usage of the equipment, including scaling will be discussed with any third party without required permission from the Project Facilitation Team. The company understands that failure to observe this agreement will lead to disqualification from the project.

Signature with Company Seal

CORRECTNESS CERTIFICATE

It is certified that information submitted in the documents as part of the response to Expression of Interest for the project is correct and complete in all respects. It is acknowledged that the company will be disqualified from further participation if any information provided is found to be incorrect.

Signature with Company Seal