

CARBON PHENOLIC THERMAL PROTECTION SYSTEMS
FOR ATMOSPHEREIC ENTRY HEATSHIELDS

Q.1. What is NASA's anticipated duration and period of performance for initial contracts awarded under this solicitation? Is five years anticipated for the initial contracts? The Announcement states that there will be multiple awards. Will it be a phased program with down-selects for subsequent phases? If "phased," what will be the approximate performance period for Phase 1?

A.1. Anticipated approximate POP for this procurement: 60-100 days. This current procurement will include multiple awards; it will not be using phased, down-select procedures.

Q.2. The Announcement speaks of multiple missions to varied destinations. What are the expected aeroshell cone angles for: 1) Gas giants; 2) Venus; and 3) Mars and Enceladus sample returns? A 45-deg half-cone angle can be tape-wrapped with good producibility. A 60-deg half-cone angle may not be compatible with tape-wrapping. Does NASA anticipate consistent cone angles of 45-deg?

A.2. No, NASA does not anticipate consistent cone angles. Both designs need to be considered.

Q.3. Does NASA envision that carbon-phenolic heatshields for some particular missions might be fully chop-molded carbon phenolic – instead of mostly tape wrapped carbon phenolic – or is significant tape-wrapping a baseline requirement for all missions?

A.3. No, likely tape wrap will be the baseline for the main heat shield, chop molded only for the nose cap.

Q.4. Why does the Announcement say "delivery of test articles of chop-molded carbon phenolic" but no mention of a requirement for similar test articles of tape-wrapped carbon phenolic?

A.4. The synopsis explains that NASA's priority in the near term is chop molded,

Q.5. Is NASA interested in pursuing robust carbon-phenolic heatshields of somewhat lower density than FM5055, perhaps 80% of the density of CMCP?

A.5. Yes, we would be interested in hearing about this capability, but would also like to see how it could be applied to tape wrapped material too. We would not want to develop a heat shield with different tape wrap and chop molded material because of the concern that the two might recede differently.

Q.6. Is NASA interested in pursuing robust heatshields that are not exclusively carbon fabric and phenolic resin, such as new-technology heatshields that could be largely carbon-phenolic but with performance enhancing "other" constituents?

A.6. Yes, see above.

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Questions and Answers
Set 1

Q.7. Will contractors be empowered to plan and execute arc-jet test series in NASA/ARC facilities to evaluate and characterize the performance CP test samples, or will contractor test samples be supplied to NASA/ARC staff for ARC's planning and execution of arc-jet test series?

A.7. No, samples are expected to be provided and NASA will plan and conduct the testing. Data will then be shared with the respective contractor.

Q.8. Will the arc-jet facilities at AEDC be available and acceptable for ablation testing of carbon-phenolic samples? Same question for the LHMEEL facility at WPAFB?

A.8. Acceptable, most likely, yes. Availability depends on NASA funding.

Q.9. Should the contractors individually price and include in their proposals the full costs of performing necessary arc-jet and other thermal ablation test series?

A.9. No, NASA will perform the testing. Price only the deliverables requested in the upcoming RFQ.

Q.10. The Announcement excludes all discussion of aeroshell structures for HCP heat shields. Should proposers plan to work suitable structures and the issues of thermostructural compatibility (etc.) with carbon-phenolic heat shields?

A.10. No, that is not the focus of this procurement.

Q.11. Will contractors be responsible for analytical thermal-ablation models (math models) for fabricated and tested heatshield test articles? This requirement would call for laboratory thermophysical properties testing in addition to arc-jet testing.

A.11. No, NASA will be responsible for thermal ablation modeling.

Q.12. Will contractors be responsible for NDI test methods to inspect carbon-phenolic test samples, MDUs, and system prototypes? Will contractors be responsible for NDI acceptance criteria, and system repairs under this program?

A.12. Yes, contractors will be responsible for NDI. NASA will likely work with the contractor to define acceptable acceptance criteria.

Q.13. Can we receive a copy of any specifications for FM 5055 G to include material specifications, processing specifications, system specifications and any other pertinent specifications?

A.13. Yes, NASA plans to include a copy of the FM 5055G acceptance specifications in the RFQ. Processing specifications are company/equipment specific and are proprietary and cannot be shared between vendors. However, NASA expects to review the processing spec so we have high confidence in the proposed approach.

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Q.14. Is NASA interested in entertaining concepts that include development of a new carbon phenolic material that includes more than just incorporation of new fibers types into the existing FM 5055 G material?

A.14. Yes, we would be interested in hearing about this capability, but would also like to see how it could be applied to both chop molded and tape wrapped material. We would not want to develop a heat shield with different TW and CM material because of the concern that the two might recede differently.

Q.15. We are wondering if you can suggest some organizations to team with on this proposal?

A.15. While NASA cannot suggest organizations for your organization to team with, a list of companies expressing interest will be posted to the RFQ.