

Manufacturing of Carbon-Silicon Carbide Composite throat

Ceramic Matrix Composites (CMC), are well known for their excellent thermo-mechanical properties and high temperature erosion resistance. There exists a huge demand for such materials where high temperature erosion and thermal shock is simultaneously encountered in applications such as Throat Inserts, Nozzles and Thrusters of propulsion systems.

A throat insert is made with typical configuration and is tested under highly erosive and corrosive exhaust gases with solid alumina particle impingement of solid propulsion particularly at the nozzle throat where high mass flux of the exhaust gases exert very high shear stresses in addition to the chemical/oxidative attack which results into a severe thermo-oxidative recession of the throat material.

ASL, Hyderabad has developed a technology of 3D non-woven NPP Carbon-Silicon Carbide (C-SiC) throat insert having uniform mechanical strength and high thermal diffusivity, which gives very high thermal shock resistance property. Uniform carbon fiber orientation/network also provides high fracture toughness. The combination of uniform mechanical and thermal properties, high thermal shock and fracture toughness of the 3D non-woven NPP C-SiC throat insert make it ideal for throat application.

These processing involve various furnaces operating under inert/vacuum atmosphere with very high temperature (up to 3000°C) and high pressure (up to 1000 bar).

DRDO has also obtained a patent of this technology naming **“Three-Dimensional Needle Punched Carbon-Silicon Carbide Composite, Methods of Fabrication thereof and Applications thereof”**.



3D NPP C-SiC throat insert

Interested companies/ industries are requested to apply against this EoI to following address:-

Director,
Advanced Systems Laboratory (ASL)
Kanchanbagh P O,
Hyderabad - 500058
Ph.No: 040- 24188400
Fax: 040-24343779
Email: director[dot]asl[at]gov[dot]in

A copy of interest may be sent to the following address (without any attachment):-

Director
Directorate Industry Interface and Technology Management (DIITM)
Room No 447, DRDO Bhawan, DRDO HQrs, Rajaji Marg, New Delhi – 110011
Phone No: 01123013209/23015291
Fax No: 011-23793008
Email ID: diitm[dot]hqr[at]gov[dot]in

List of Support documents to be attached with EoI

- a) Memorandum and Articles of Association (Should be incorporated as per Indian Companies Act, as amended time to time)
- b) Certificates of registration as a manufacturing unit, if any.
- c) Audited Balance Sheet for the preceding three years.
- d) Income Tax returns for the preceding three year period
- e) Details of shareholding/ownership pattern especially foreign partners/ shareholders, foreign employees, directors, etc. The company must adhere to the prevailing Govt of India policies and regulations on Foreign Direct Investment (FDI)/DIPP norms as applicable.
- f) Annual budget for R&D during last three years.
- g) Numbers and details of IPR or patents, etc., held by the company.
- h) Number of technically or professionally qualified personnel.
- i) Record of past performance (e.g., Supply orders executed against of Ministry of Defence orders, Public Sectors and Paramilitary Forces, if any).
- j) Availability of adequate infrastructure (List of machines and their production capacities) and technical expertise.
- k) List of Testing and Support equipment's
- l) ISO/ ISI certification or any other certification
- m) Relevant clearances form the authorities/ ministries (if any)
- n) Capacity and capability to undertake developmental work and to accept attendant financial and commercial risks.
- o) Capacity/capability to market the product through the marketing network, sales and service network, reliability to maintain confidentiality.

- p) PESO and DPIIT license for explosive handling if ToT is for high energy Material, explosives, propellants, and component/ system dealing with it etc.
- q) Under taking form company seeking ToT that none of its Directors, Independent Directors, non-executive Directors, Key management personnel are involved in any corrupt practices, unfair means and illegal activities.
- r) Details of the industrial license for defence manufacturing be provided by the industry seeking ToTs.