

Expression of Interest

1. Name of the Technology: TiB_2 Ceramic for Armour Application

2. Developed by DRDO Lab/ Estt Name: Defence Metallurgical Research Laboratory (DMRL).

3. Brief write-up :

Ceramic materials are increasingly recognized as a promising option for armour applications due to their distinctive properties, including exceptional hardness and low density. Common ceramic materials used in armour applications include Alumina (Al_2O_3), Boron Carbide (B_4C), and Silicon Carbide (SiC). Titanium diboride (TiB_2) is an advanced armour ceramic that distinguishes through its high elastic modulus and fracture toughness. These properties make it particularly advantageous against long-rod penetrators, giving it a significant edge over other armour ceramics. Therefore, TiB_2 ceramic technology has been developed for ballistic applications against long-rod penetrators. In this technology, TiB_2 ceramic discs were developed using a pressure-assisted sintering technique with a high vacuum high temperature hot press. Both composition and hot-pressing parameters were optimised to achieve full densification with controlled mechanical properties. The process has been successfully scaled up to produce TiB_2 discs of 150 mm diameter and 30 mm thickness.

4. Minimum facility / capability required at the time of submission :

- a. **High energy ball mill** – The high energy ball mill shall have a minimum operating speed of 150 RPM and shall be capable of continuous operation for at least 6 hours. The mill shall be equipped with a tungsten carbide grinding bowl having a minimum capacity of 250 ml, along with tungsten carbide grinding balls.
- b. **High vacuum high temperature hot press**–The hot press shall be capable of continuous operation at a temperature of 2000°C and shall have a minimum load capacity of 30 tons. The hot press shall be capable of operating either under a controlled inert atmosphere or under vacuum conditions.

5. Requirements of technology absorption certificate (if any) and accordingly number of samples/products/prototypes required to issue certificate. Cost of sample and testing & evaluation cost to be borne by ToT recipient industry.

Three number of hot-pressed discs of 100 mm diameter and 6 mm thickness for ballistic testing.

6. All Industries interested in seeking ToT are requested to furnish details in the format given in Part-1 & Part-2 below of Annexure I. The list of documents to be attached is provided in Annexure – II. Kindly provide the reference of page no. of supporting document in the relevant field also.

7. **Interested Industries are requested to forward their Expression of Interest (Eoi) as follows:**

‘Application cum Industry Assessment Form’ given in Annexure-I to be forwarded to the Director, DMRL, Hyderabad along with all supporting documents via email:

Director, Defence Metallurgical Research Laboratory (DMRL)

Kanchanbagh, Hyderabad, 500058

Telephone : 040-2458-6300

Fax : 040-24340080

Internet Email: director.dmrl@gov.in

8. A copy of Application cum Industry Assessment Form’ for both categories may be forwarded to Director DIITM, DRDO HQ on the following address for information via email:

Director

Directorate of Industry Interface & Quality Management (DIIQM)

Room No. 447, DRDO Bhawan, DRDO HQrs,

Rajaji Marg, New Delhi-110011

Phone : 011-23013209/23015291

Fax : 011-23793008

Email : director-diiqm-hqr@gov.in

Application cum Industry Assessment Form

- i. To be submitted by industry/ organization seeking Technology Transfer.
- ii. Documents in support of information provided to be enclosed
- iii. Specify the details in Part-1 and Part-2

Date:

PART-1

General Information

S. No	Information	Detail	Attachment reference
1.	Name of the Technology requested for Technology Transfer		
	Name of the concerned Lab/ Estt		
	Category		
2.	Name of the industry/ organization		
3.	Complete Address and other details		
	Registered Office State Phone No Fax Email Website		
	Factory State Phone No Fax Email Website		

4.	Point of Contact Name Designation Address Mobile No Ph No Email ID		
5.	NAME OF CMD/ MD /PARTNERS/ PROPRIETOR/ etc Name Designation Address Mobile No Ph No Email ID		
6.	Date of Incorporation of company		
7.	Foreign Direct Investment in company (if any in %)		
8.	Shareholding pattern		
9.	Turn over as per Audited Balance Sheet for the preceding three years. Year ____ Year ____ Year ____		
10.	Annual budget for R&D during last three years (if any) Year ____ Year ____ Year ____		
11.	Income Tax returns for the preceding three years period Year ____ Year ____ Year ____		
12.	Nature of company DPSU, Private Limited, Public Limited, Partnership, Proprietary, Ex- Serviceman Unit		

13.	Category of industry Large Scale, Medium Scale, Small Scale, Micro, Startup		
14.	MSME Registration No		
15.	Certificates of registration as a manufacturing unit, if any.		
16.	If Startup, DPIIT Registration No		
17.	UDYOG AADHAR No		
18.	PAN Number		
19.	Status and details of Industrial license for defence manufacturing issued by DPIIT		
20.	Details of PESO license (if any)		
21.	GST Number		
22.	Nature of business Manufacturing/ Sole Selling or Authorized Agent/ Assembler/ Traders/ Dealer/ Processor/ Repacker/ Others		
23.	Details of current products and services Products and services Supplied (specify Govt/ Domestic market/ Export)		
24.	Record of past performance (e.g., Supply orders executed against of Ministry of Defence orders, Public Sectors and Paramilitary Forces, if any).		
25.	Details of registration with NSIC / SSI, DGS&D, other Defence Department, other Govt. Dept, membership of FICCI/ASSOCHAM/CII or other Industrial Association (Attach relevant copies of registration letters)		
26.	Have you already taken any technology from DRDO (If yes, give details attaching separate sheet) Name of the Technology, Lab/ Estt, Year, License number & Status		
27.	ISO/ ISI certification or any other certification (If yes, give details)		

28.	Relevant clearances form the Authorities/ Ministries (if any)		
29.	Capacity and capability to undertake developmental work and to accept attendant financial and commercial risks.		
30.	Capacity/capability to market the product through the marketing network, sales and service network, reliability to maintain confidentiality.		

PART-2

Infrastructure and other Information

1.	Total area of factory Covered (m ²), Uncovered (m ²), Bonded space available (m ²)	
2.	Ownership of factory Self-owned, partnership, rental	
3.	Electric power Sanctioned	
	Installed Standby (if any)	
4.	Availability of adequate infrastructure (List of machines and their production capacities) and technical expertise	
5.	Name of bank & A/c No Name of bank A/c type A/c no Address of the bank Phone: Email:	

6. Details of current products:

Sl.no.	Type	Description	Licensed/installed capacity	Annual production for preceding 3 years

7. Details of foreign collaboration, if any

Sl.no.	Product	Name & address of collaborator	Year	Remarks

8. Details of products developed for services

Sl.no.	Nomenclature of stores	Order number and date	Remarks

9. Give details of important facilities & infrastructure as per following format for:

- (a) Conventional Machines
- (b) Unconventional, Special Machines
- (c) Testing & quality control facilities

10. Furnish the following details with relevant certificates and documents

- (a) R&D facilities available :
- (b) Inspection quality control of raw material components :
- (c) Assistance from central agency for testing / calibration etc. :
- (d) Laboratory and drawing office facility:

11. Principal customers:

Sl.no.	Name & address	S.O No. & date	Date of last supply	Products supplied	Value

12. Future plan (if any) in respect of expansion programme installation of additional machines/ test facilities etc.

13. Give self-assessment of your capability to absorb the technology

14. Any additional condition specified in the EoI compliance (to be submitted on separate sheet) to be enclosed with this form.

15. Details of employee as on date on firm's pay roll

PERMANENT

Category	Post Held	Number	Qualification	Total Service
Technical	Prod. Manager Q.C. Manager, Supervisor, Testing Staff (QC), Skilled workers, Unskilled workers, etc.			
Administrative	Purchase Manager Accounts Officer Office Superintendent Clerical Others etc			
TEMPORARY				
Category	Post Held	Number	Qualification	Total Service
Technical	Prod. Manager Q.C. Manager, Supervisor, Testing Staff (QC), Skilled workers, Unskilled workers, etc.			
Administrative	Purchase Manager Accounts Officer Office Superintendent Clerical Others, etc			

DECLARATION:

I / we confirm that the information furnished in Part 1 & 2 above is correct. In the event of any information given by me / us is found incorrect / false at any time, I / we understand our EoI for ToT will be cancelled/ rejected without notice, beside any other appropriate action against me / us.

Industry seal

Authorized signatory

Name(s) in capital

Designation and seal of authorized signatory

Dated:

Place:

List of Supporting 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 employed.
- 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.
- l. ISO/ ISI certification or any other certification.
- m. Relevant clearances from 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. Industrial license for defence manufacturing issued by DPIIT (if any).
- q. PESO and DPIIT license for explosive handling if ToT is for high energy Material, explosives, propellants, and component/ system dealing with it etc. Any other special license compliance requirement to be specified by the lab.
- r. Undertaking from company seeking ToT that none of its Directors, Independent Directors, non-executive Directors, Key management personnel are involved in any corrupt practices, unfair means/ illegal activities.