

Assembly Brake Lining for Main Brake System of Tracked Vehicles

Assembly Brake Lining is a complex composite material and consists of copper base matrix reinforced with Tin, Graphite and Mullite that impart diverse properties such as friction, wear stability and thermal stability. Copper based friction materials have many advantages, such as better heat conductivity for efficient heat dissipation and higher anti-wear property compared to iron based materials.

Each Assembly Brake lining consist of two Sintered brake shoes, riveted on Steel Back plate. Brake Shoes are manufactured with Powder Metallurgy technique, in which various metallic and non-metallic powders are mixed, compacted and subjected to high temperature, pressure sintering.

Process details in brief:

a. Mixing: Mixing and blending, two common pre-compaction steps used in the brake pad manufacture, combine powders into a homogeneous mass. Blending refers to the combination of different sized powders of the same chemistry to achieve control over the particle size distribution and remove powder segregation, whereas mixing implies different powder chemistries to form new composition. Small particles will agglomerate during mixing process because of a high surface area and the action of one of the weak forces.

b. Compaction: The compaction stages in the powder mix starts with particle rearrangements. As the compaction pressure increases, the relative volume of each particle undergoing plastic deformation increases. At low pressures, plastic flow is localized to particle contacts. As the pressure increases, homogeneous plastic flow spreads from the contacts and the entire particle become work hardened. The large pores are eliminated first and the particle coordination number increase to distribute the load.

c. Sintering: Compacted Brake pads are subjected to pressure sintering in controlled atmosphere in Bell Furnace. Hydrogen is used as reducing gas during sintering. It also provides high thermal conductivity and carbon control, while the nitrogen gas is used to minimize explosive dangers.

1. **Industries are requested to submit their expression of Interest for ToT within 21 days of publishing of technology on DRDO web-page.** Interested companies/ industries are requested to apply against this EoI to following address:-

To,

The Director

Combat Vehicles Research & Development Establishment (CVRDE)

Defence Research and Development Organisation (DRDO)

Government of India, Ministry of Defence

Avadi, Chennai- 600 054

Ph: 044 - 26383722, 26364001

Fax: 044-26385112, 26383661

Email: director[dot]cvrde[at]gov[dot]in

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

To,

The Director,

Directorate of Industry Interface & Technology Management (DIITM),

Room No. 447, DRDO Bhawan, Rajaji Marg, New Delhi-110 011

E-mail: diitm.hqr@gov.in

Phone No. 011-23007446

Fax-011-23793008

All industries interested in seeking ToT are requested to apply in the format given below. Kindly fill in the fields. The list of documents to be attached is provided in Annexure – I. Kindly provide the reference of page no. of supporting document in the relevant field of form.

PART-1

General Information

(Please enclose documents in support of information provided)

1.	Name of the Technology requested for Technology Transfer (Technology name and concerned Lab, 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.	Details of Industrial license for defence manufacturing issued by DPIIT (if any)	
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 (please 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, 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:

S.No	Type	Description	Licensed/installed capacity	Annual production for preceding 3 years

7. Details of foreign collaboration, if any

S.No	Product	Name and address of collaborator	Year	Remarks

8. Details of products developed for services

S.No	Nomenclature of stores	Order No. and date	Remarks

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

- (a) Production
- (b) Unconventional, special m/c
- (c) Testing & quality control facilities

S.No	Description of m/c	Make & model	Qty	Date of purchase	Remarks

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:

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

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

13. Name of the technology requested for transfer

(give self-assessment of your capability to absorb the technology)

14. 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	Manager Q.C. Manager Supervisor Testing Staff (QC) Skilled workers			

	Unskilled workers, etc			
Administrative	Purchase Manager Accounts Officer Office Superintendent Clerical 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

Date:

Place

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 industrials license for defence manufacturing be provided by the industry seeking ToTs.
- (s) Application cum Industry Assessment Form