

Germanium Single Crystal Growth for Infrared Optics

Germanium is the preferred material for fabrication of lens and window material for high performance infrared imaging and sensing systems in the 2–12 μm wavelength owing to its large refractive index, high infrared transmission and good machinability. Hence, Germanium single crystals are widely used for the fabrication of infrared optics in the form of lenses, prisms and windows in various infrared devices. Keeping the huge requirement of infrared detectors for various strategic defence and space applications under consideration, large number Germanium single crystals are required for the fabrication of various optical components which are imported at a high cost. Hence, SSPL has indigenously developed the technology to grow optical quality Germanium single crystals and fabrication of blanks. SSPL developed Germanium blanks have been used both by other DRDO laboratories and outside production agencies for fabrication of infrared lenses which have been extensively tested and the performance have been found at par with the imported materials. Typical specifications of grown Germanium crystals include diameter ≥ 100 mm, Resistivity 5-30 Ωcm , and Infrared transmission $\geq 45\%$ in 2-12 μm range.

Interested industries are requested to submit their financial bid in sealed envelope, along with relevant documents as per the list in appendix-A, through one of the following agencies only, to DRDO before the bid ending date:-

S. No	Name of the Agency	Point of Contact
1	National Research Development Corporation Address :20-22, Zamroodhpur Community Centre, Kailash Colony Extn. New Delhi - 110048 Tel : +91-11-29240401 to 29240407 Fax: +91-11-29240409 / 29240410 General E-mail : write2[at]nrdc[dot]in	Shri Rajendra Gondane Sr. Manager (Business Development) National Research Development Corporation 20-22, Zamroodhpur Community Centre, Kailash Colony Extn. New Delhi - 110048 INDIA Mobile : +91-9910496554 EPABX : +91-11-29240401-07 (Extn. 444) Fax : +91-11-29240409 -10 Email : rgondane[at]nrdc[dot]in Website : www[dot]nrdcindia[dot]com

2	<p>PHD Chamber of Commerce and Industry Address: PHD House, 4/2 Siri Institutional Area, August Kranti Marg, New Delhi 110016</p> <p>Tel : 91-11-26863801-04, 49545454 Fax : 91-11-26855450, 49545451 Website : www.phdcci.in E-mail : phdcci[at]phdcci[dot]in</p>	<p>Shri Nasir Jamal Joint Secretary PHD Chamber of Commerce & Industry Address: PHD House, 4/2 Siri Institutional Area, August Kranti Marg, New Delhi 110016 INDIA</p> <p>Mobile : +91-9810185714, 8210343267 Phone : +91-11-49545454, 49545400 Extn : 279 Fax : +91-11-26855450</p>
3	<p>Confederation of Indian Industry (CII) Address: The Mantosh Sondhi Centre 23, Institutional Area, Lodi Road, New Delhi - 110 003 (India)</p> <p>Tel : 91 11 45771000 / 24629994-7 Fax : 91 11 24626149 E-Mail : info[at]cii[dot]in Website : www.cii.in</p>	<p>Shri Amit Kumar Deputy Director – Defence & Aerospace Society of Indian Defence Manufacturers (SIDM) C/o Confederation of Indian Industry (CII) Address: 3rd Floor, IGSSS, 28 Institutional Area, Lodhi Road, New Delhi – 110003 INDIA</p> <p>Mobile : +91-9990059163 Phone : +91-11-45772062 Fax : +91-11-45772022 Email : amit[dot]kumar[at]cii[dot]in Website : www.sidm.in</p>
4	<p>The Associated Chambers of Commerce and Industry of India (ASSOCHAM) 4th Floor, YMCA Cultural Centre and Library Building, 01, Jai Singh Road, New Delhi - 110001</p> <p>Phone: 46550555 (Hunting Line) Fax: 01123347008/9 Website : www[dot]assochem[dot]org</p>	<p>Ms Kavita Sharma Addl Director and Head - Energy and Infra Mobile : 09871801002 Tele: 0091-11-23347040 Email: kavita[dot]sharma[at]assochem[dot]com Website : www.assochem.org</p>

List of Supporting Documents to be Attached / Enclosed

- (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.