

Low Pressure Twin Fluid Water Mist Technology for Fire Suppression

Water mist technology has emerged as the most viable alternative to ozone depleting Halons for fire suppression applications. Fine water mist relies on relatively small ($<100\text{ }\mu\text{m}$) droplet sprays to extinguish fires. The fire suppression mechanism of water mist is attributed to rapid evaporation of fine water droplets in the flame zone resulting in cooling and inerting of the enclosed volume. It offers lower water demand (than standard water sprinkler systems) and is able to extinguish fires in obstructed spaces (a key feature of halons and other gaseous agents). Other advantages include low agent cost, non-toxicity, environmentally benign, effectiveness in suppression of flammable liquid pool and spray fires and potential efficacy as inerting or explosion suppression systems. The water mist fire suppression systems can be used in a wide range of applications, including Class B spray and pool fires, fires in aircraft cabins, shipboard machinery, engine rooms & accommodation spaces and computer and electronics applications.

The CFEES water mist system is a total flooding type of twin fluid water mist system to provide volume protection of a compartment. It utilizes an indigenously designed twin fluid internally mixing type nozzle which works at 2-4 bar pressure of water and 4-6 bar pressure of air or nitrogen gas for generation of water mist with Sauter mean diameter (SMD) less than $50\text{ }\mu\text{m}$ and mist generation rate in the range 1-3 LPM. A Patent has been filed for the developed nozzle entitled "An atomizer and a total flooding twin fluid based fire Protection system comprising the same" (no. 509/DEU2012).

Under an R&D project for development of this technology, CFEES has set-up extensive test and evaluation facilities and carried out experimental studies for optimization of various mist system parameters to achieve high fire suppression effectiveness, equal or better than Halon using the developed twin fluid nozzle. Based on series of experiments (>100 nos.) in different scale chambers at CFEES on fires ranging from 5 kW/m^3 to 20 kW/m^3 , a methodology has been evolved for design of the water mist system which has been validated in a real scale chamber having height of 5 m and free volume of approx. 1000 m^3 . The performance of water mist system in the chamber was evaluated as per the fire scenarios mentioned in IMO Circ 1165 and was demonstrated to suppress various types of Class A & Class B pool & spray fires within 120 s with thermal management (compartment temp. $60\text{ }^{\circ}\text{C}$) achieved within 60 s as against the IMO qualification criteria of 900 s and 300 s (for $100\text{ }^{\circ}\text{C}$), respectively.

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. N o	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	PHD Chamber of Commerce and Industry Address: PHD House, 4/2 Siri Institutional Area, August Kranti Marg, New Delhi 110016 Tel : 91-11-26863801-04, 49545454 Fax : 91-11-26855450, 49545451 Website : www.phdcci.in E-mail : phdcci[at]phdcci[dot]in	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 Mobile : +91-9810185714, 8210343267 Phone : +91-11-49545454, 49545400 Extn : 279 Fax : +91-11-26855450
3	Confederation of Indian Industry (CII) Address: The Mantosh Sondhi Centre 23, Institutional Area, Lodi Road, New Delhi - 110 003 (India) Tel : 91 11 45771000 / 24629994-7 Fax : 91 11 24626149 E-Mail : info[at]cii[dot]in Website : www.cii.in	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 Mobile : +91-9990059163 Phone : +91-11-45772062 Fax : +91-11-45772022 Email : amit[dot]kumar[at]cii[dot]in Website : www.sidm.in
4	The Associated Chambers of Commerce and Industry of India	Ms Kavita Sharma Addl Director and Head - Energy and Infra

<p>(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]assocham[dot]org</p>	<p>Mobile : 09871801002 Tele: 0091-11-23347040 Email: kavita[dot]sharma[at]assocham[dot]com Website : www.assocham.org </p>
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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
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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 https://xdt.drdo.in	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	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

Date:

Place:

Appendix-A

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 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) 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 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 and illegal activities.
- (r) Details of the industrial license for defence manufacturing be provided by the industry seeking ToTs.