

**भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद**

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004****(An Institute of National Importance under Ministry of Education, Govt. of India)****PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in**

File no. ME-PRJ-006-26-27

Date: 7th May 2026**Request for Quotation**

To,

Subject: Procurement of Simcenter STAR-CCM+ Academic Pack

Sir,

Indian Institute of technology (Indian School of Mines), Dhanbad is interested in the purchase of the materials/ equipment/service listed below:

Sl.No.	Detailed Specifications	Quantity
1	Procurement of Simcenter STAR-CCM+ Academic Pack (Specification in Annexure –II)	01 No

INSTRUCTIONS:

- 1) Please attach relevant technical literature of the item.
- 2) Please fill in the attached form 01 regarding class of supplier.
- 3) Please mention warranty/ guarantee period in your offer. Equipment/ material supplied must have minimum warranty/ guarantee of **12 months**.
- 4) Please enclose authorization certificate from OEM.
- 5) Please mention after sales service information in your offer.
- 6) ***Please attach a certificate that the quoted price is not more than that of any other Govt. organization/ institution in India. This has to be mentioned in the offer letter clearly.***
- 7) The rates should be quoted for each item separately as per price schedule attached as annexure I (A) & (B). The comparison between the indigenous and the foreign offers shall be made on FOR destination basis and CIF/CIP basis respectively. However, the CIF/CIP prices quoted by any foreign bidder shall be loaded further as under:
-Towards customs duty, IGST and other statutory levies, custom clearance, inland transportation, currency fluctuation etc. – 15% of the CIF/CIP value. Duties & taxes, if applicable, are to be shown separately clarifying whether those are extra or included in the price.
- 8) The items/ materials shall be required to be delivered to the Mechanical Engineering Department of IIT (ISM) Dhanbad at the risk and cost of the tenderer.
- 9) Your tender must be **valid for minimum 180 days** from the date of opening of tender.
- 10) Full details of service offered should be given in the tender along with supporting relevant literature / Technical Literature.
- 11) The items offered should be of good quality, confirming to BIS standards, wherever applicable.
- 12) ***Advance payment is not admissible.*** Payment shall normally be made within 3-4 weeks subject to receipt and acceptance & installation (as per Purchase Order Terms) of the materials ordered/items.
- 13) In the materials/items ordered to supply the materials or install the same as contractual condition, IIT (ISM) Dhanbad shall have the right to deploy suitable agency/ third party to get the job completed at the risk and cost of the supplier.
- 14) Tender may please be submitted ***in sealed cover only superscribed with Enquiry No. ME-PRJ-006-26-27 latest by 28.05.2026.***
- 15) **The offer must be submitted in the office of Deputy Registrar (Project Purchase Section), IIT (ISM), Dhanbad– 826004 (Jharkhand, India) only. Please send your offer by Regd. Post/ Speed Post/ Courier along with Courier receipt, Email/Fax. Tender/ quotation will be received during IIT (ISM) Dhanbad working hours only (i.e. Monday to Friday).**

**भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद**

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004****(An Institute of National Importance under Ministry of Education. Govt. of India)****PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in**

File no. ME-PRJ-006-26-27

Date: 7th May 2026

- 16) **EMD:** EMD of an amount of **Rs. 9,940/-** in form of Demand Draft in favor of Registrar, IIT (ISM) Dhanbad payable at Dhanbad. EMD can also be submitted in the form of Term Deposit Receipt/ Fixed Deposit Receipt/Bank Guarantee drawn in favor of Registrar, IIT (ISM)Dhanbad.
- 17) **Performance Bank Guarantee:** A bank guarantee issued by a Nationalized Bank in India towards PBG for an amount equal to 5% of total value of purchase order and valid till the period beyond two months of completion of warranty period should be submitted in favour of **Registrar, IIT (ISM) Dhanbad.**
- 18) Any other information that you may like to obtain, you are free to contact IIT (ISM) Dhanbad before submission of tender.
- 19) IIT (ISM) Dhanbad reserves the right to accept and/or to reject any/all tenders without assigning any reason.
- 20) **Payment:** Payment will be made within 30-45 days after satisfactory supply, inspection, installation/commissioning/ satisfactory services & acceptance and on submission of pre-receipted tax invoice, delivery challan, warranty certificate and installation report in triplicate
- 21) a) **In a tender, either the Indian agent on behalf of the principle/ OEM and the Principle/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.**
b) **If an agent submits bid on behalf of the principle/ OEM, the same agent shall not submit a bid on behalf of another principle/ OEM in the same tender for the same item/product.**

For and on behalf of
IIT(ISM), Dhanbad

Deputy Registrar
(Project Purchase Section)



GSTIN : 20AAAAI0686D1ZA

भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004**

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026**Annexure –I(A)****1. PRICE SCHEDULE FOR GOODS BEING OFFERED WITHIN INDIA**

Name of the Bidder _____

NIT Reference No. _____

File Reference No. _____

Sl. No.	Full Description of items with (HSN Code/SAC Code)	Quantity	Unit Price (in INR)	Total Amount (in INR)
1.				
2.				
3.				
Ex-Works Price-				
Packing & Forwarding				
Transportation				
FOR (IIT ISM) Dhanbad				
GST/IGST (their rate(s) as the case may be, clearly specified)				
<u>Please note that IIT ISM is eligible for Concessional GST as per Notification No. 45/2017-Central Tax (Rate) for CGST, 45/2017-State Tax (Rate) for SGST and 47/2017-Central Tax (Rate) for IGST.</u>				
Insurance up to Destination/handover (in case of fabrication)				
Installation & Commissioning charge				
Training charges, if any				
Additional Warranty Charges, if any				
Annual Maintenance Charge, if any				

*(On the basis of the technical specifications submitted)

Total Bid Price _____

in words _____

Note :

(a) The Price schedule of optional items shall be indicated in a separate sheet in the same Performa.

(b) Cost spare parts may be indicated separately

Signature of Bidder

Name _____

Business

Address _____

**भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद**

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004**

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026**Annexure –I(B)****SELF-CERTIFIED DECLARATIONS FOR TAKING PART IN TENDER****a. Regarding blacklisting / debarring****b. Insolvency**

1. I / We _____ (Tenderer) hereby declare that the firm / agency / Company, namely M/s _____ has not been declared as **insolvent**.

AND

2. I / We _____ (Tenderer) hereby declare that the firm / agency / Company, namely M/s _____ has not been **blacklisted or debarred** in the past by Union / State Government or Organization from taking part in Government tenders in India.

OR

2. I / We _____ (Tenderer) hereby declare that the Firm/Agency/Company, namely M/s _____ was **blacklisted or debarred** by Union/ State Government or any Organization from taking part in Government tenders for a period of _____ years w.e.f. _____ to _____. The period is expired and now the Firm/Agency/Company is entitled to take part in Government tenders.

In case the above information is found to be false I / We are fully aware that the tender/contract will be rejected / cancelled by Director, IIT(ISM) Dhanbad, and EMD shall be forfeited.

In addition to the above the Director, IIT(ISM) Dhanbad will not be responsible to pay the bills for any completed/partially completed work.

Date:**Place:****Self Certification:** _____**Name:** _____**Address:** _____**Stamp:**



GSTIN : 20AAAAI0686D1ZA

भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004**

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

Annexure –I(C)

UNDERTAKING

(To be signed and submitted/uploaded along with technical bid documents on Company's Letter Head)

(As per Office Memorandum No. F.7/10/2021-PPD (1) dated: 23.02.2023 issued by Department of Expenditure (Ministry of Finance), Govt. of India)

Model certificate for Tenders

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached]"

Place:

Signature: _____

Date:

Name: _____

Stamp: _____

OR

Model certificate for tenders for work involving possibility of sub-contracting

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contracting from such countries I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub contract any work to a contract form such countries unless such contractor is registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. [Provide Compliance for the above in Vendor Specified Commercial Terms.]"

Place:

Signature: _____

Date:

Name: _____

Stamp: _____



GSTIN : 20AAAAI0686D1ZA

भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education, Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

Form-1

Declaration by bidder

(Please specify Class of Supplier and Local Content percentage)

In accordance and manner as specified in Order No. P45021/2/2017-PP (BE-II) dated : 04th June 2020 and 2th March 2021 issued by DIPP, Ministry of Commerce and Industries, GoI.

To,

The Director,

Indian Institute of Technology (Indian School of Mines)

Dhanbad -826004

Respected Sir,

In accordance with the order No. P-45021/2/2017-PP (BE-II) dated 04th June, 2020 and P-45021/2/2017-BE-II-Part (1) (E-50310) dated 4th March 2021 I hereby declare that

I am aware about all provision mentioned in Tender No. ME-PRJ-006-26-27 as well as order No. P-45021/2/2017-PP (BE-II) dated 04th June, 2020 and P-45021/2/2017-BE-II-Part (1) (E-50310) dated 4th March 2021 and abides by the same.

I declare that for this tender, I am a **Class-I local supplier / Class-II local supplier / Non-local supplier** (Strike out whichever is not applicable) and classification is based on local content of goods/services/work offered by bidder in this tender.

Local content (in percentage) in offered good/services/work is: _____ %

Whereas 'Local Content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

The services such as transportation, insurance, installation, commissioning, training and after sales service support like ACM/CMC etc. are not included as Local content in case of imported products.

The local content for all inputs which constitute the said goods/services/works has been verified and bidder is responsible for the correctness of the claims made therein.

Date:

Signature:

Name of Authorized Signatory:

Name of Bidder:

Seal of Bidder:

**भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद**

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004**

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026**Technical Specification of Star CCM+ Software****Technical Specifications****1. Geometry Modelling Tools:**

Software to offer an in built CAD modeller in same GUI environment with following capabilities

- The tool has design modes such as 3D-CAD Sketch, 3D-CAD Solid body, 3D-CAD Sheet Body.
- Feature to create additional sheet bodies, sew sheet bodies, and extend surface and solid bodies.
- Advanced options such as Transform, Translate, Scale, Rotate, and Mirror, Boolean operations like Unite, Subtract, Intersect, Imprint and Slice.
- Create Linear Pattern, Linear Pattern cut, Circular Pattern, Circular Pattern cut, Shell and Sheet Body Thickening.
- Additional feature to extract both internal and external volumes of flow domain.
- Features to check geometry validity, De-feature capability, calculation of coordinate extents.
- Options to create Loft, Loft cut, Sweep, Sweep Cut, Extrude, Extrude Cut, Resolve, Resolve Cut, Create sheets from sketch and Sketch Imprint.
- Explicit options to create Design Parameters such as Length, Angle and Generic parameter than can be altered during optimization or DoE studies.
- Option to import other 3rd Party CAD geometries such as IGES, Parasolid, STEP, CATIA V4, CATIA V5 formats, SolidWorks, Pro/E, UG-NX, VDA, Rhino, JT-Open and B-rep formats.
- Option to export CAD data as Parasolid, STEP, IGES.

2. Geometry Data Import Options accept all industry standard formats as give below

- STL, Patran Shells, Nastran Shells, FELISA Front surface, IGES, Parasolid, STEP, CATIA V4, CATIA V5, SolidWorks, Pro/E, UG-NX, VDA files, Rhino, JT-Open surface files, Auto Desk Inventor, CATIA CGR format and 3D-XML format which can also be an offer with additional license.

3. Pre-Processing Capabilities:

CFD software should have an in-built pre-processing capability in same GUI environment

- Features to create additional parts such as Block, Cylinder, Sphere and Cone.
- Capability to create and find a contact/interface among the imported parts.
- Options to Edit part bodies in 3D-CAD, Repair CAD, Translate, Scale, Rotate, Mirror, Boolean operations like Unite, Subtract, Intersect, Imprint and Slice.
- Ability to split part bodies by Surface Topology, Non-Contiguous, Split by Patch, Split by Angle.
- Surface Repair, Feature lines Repair and Vertices managing features are available in the same GUI environment.

4. Mesh Operations

Software can generate both surface and volume mesh seamlessly in a single GUI without switching over to multiple windows/wizards with a single click.

Meshes can be generated in serial, concurrent and parallel mode.



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

- Automated Mesh
- Surface Wrapper
- Automated Mesh (2D)
- Directed Mesh

5. Volume Mesh types:

Software is having various types of major cell types that are proved across industries like hexahedral, polyhedral etc.

- Polyhedral
- Trimmed
- Tetrahedral
- Thin Mesh
- Advancing Layer Mesh
- Prism Layer Mesh
- Additional Meshing Models

6. Mesh Refinement Controls:

- Ability to specify Global level, Region level and Boundary level mesh settings.
- Also, specific requirements like wake refinement, part level controls, volumetric controls.
- Surface-based refinement settings
- Curvature-based refinement settings
- Proximity-based refinement settings
- Smoothing settings
- Transition and boundary/surface growth settings
- Local Surface wrapper/ Remesher/ Volume

• Surface Remesher and Surface Wrapper

- Curvature, proximity, compatibility refinements in Surface Remesher and Surface Wrapper.
- Ability to maintain minimum face quality, generate aligned meshes, enabling automatic surface repair and mesh size table option.
- Wrapper has gap closing and mesh alignment features.
- Wrapper offers contact prevention, feature angle, scale factor, volume of interest specification and project to CAD options.

• Prism Layer Mesher

- Prism Layer able to customise as per need.
- Prism Layer stretching function and type of stretch function, gap fill minimum thickness, layer reduction percentages, boundary march, concave, convex angles specifications, near core layer aspect ratio and improving subsurface quality.
- Ability to change wall thickness, stretch factor, thickness ratio in Prism Layer.

7. Solving Features of CFD Tool

Software is capable of modelling multi-physics, multi-material situations in both time and space domain.



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

GSTIN : 20AAAAI0686D1ZA

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

• Time and Space Domain Features

- Ability to model 2D, 3D, Axisymmetric geometries. Also, ability to generate Shell 3D to model it for fluid and solid continuum.
- Capable of handling steady situations, unsteady situations using explicit unsteady, implicit unsteady, harmonic balance approaches.

• Algorithms

- Tool has some of the standard solving algorithms like SIMPLE, PISO Unsteady which are proved across industries.
- Capability of handling all flow regimes using Pressure based and Density based approaches. That is, Segregated Flow solver and Coupled Flow solver.
- Ability to alter between 1st Order and 2nd Order time discretisation.
- Ability to choose 1st Order, 2nd Order differencing schemes for convective and diffusion terms. Also, calculation of Viscous heating such as Skin Friction Heating.
- Ability to choose choice of precision.
- Hybrid MUSCL third-order/central-differencing.

• Material

- Ability to model either Gas, Liquid, Solid, Eulerian Multiphase, Multi-Component Gas, Liquid & Solid.
- Capable of handling Rheology materials as well.
- Ability to handle Constant or Variable fluid properties including temperature and composition dependence.
- A complete comprehensive database containing material properties for standard fluids and solids that are widely used across industries.
- Above materials are modifiable as and when needed.

• Physics

- **Turbulence:** Turbulence modelling using RANS, k-epsilon, k-omega, Reynolds Stress Turbulence, Spalart-Allmaras Turbulence model.

Under k-epsilon, variations like Standard, Realizable, V2F, EB K, AKN K and under k-omega, variations like SST (Menter) and Wilcox. RST variations are Elliptic Blending, Linear and Quadratic Pressure Strains.

- **Advanced Turbulence:** Advanced turbulence models like LES, DES, transition modelling.
All turbulence models are capable of handling high, low, medium Re with Two Layer, All Layer treatments.

- **Compressible flow:**

Software offers solver capability to simulate high mach number external aerodynamics such as Transonic flows (Drag prediction at cruise), Subsonic flows (High-lift performance, Low-speed drone ADB generation), Supersonic flows (Inlet design, Engine thermal management,



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

Droplet collection efficiency and Store separation), Hypersonic flows, Ice accretion.

- **Electro Magnetics:** Capability to model Electrostatics, Electric Currents, Magnetic Field, Ohmic Heating, Magneto Hydro Dynamics using both FV and FE approaches for 2D, Axisymmetric and 3D.
- **Electro Chemistry:** Electrochemistry capability to study chemical reactions which occur due to an imposed electrical charge, or a difference in electrical potential at a boundary between a conductor—such as a metal—and an electrolyte for application such as Chrome plating, Modelling Corrosion, Fuel Cells, Ionic Wind, E-Coating, Electrochemical surface and bulk reactions.
- **Chrome Plating:** Software is having in-built Electro plating and Chrome Plating capability along with global material library.
- **Multiphase flow models:** Models to simulate complex industrial multiphase flow applications such as Lagrangian, Eulerian, Dispersed Multiphase, Volume of fluid, Fluid Film, Multiphase segregated are part of standalone software.
 - **Eulerian Multiphase (EMP) Model:** Used for modelling miscible fluids mixed on length scales smaller than we wish to resolve. Used primarily for miscible fluids where one phase is dispersed as droplets or bubbles in another continuous phase in cases of bubble columns, mixing vessels, setting tanks, fluidized beds. EMP Can model phase change and crystal growth
EMP has population balance models for modeling the size distribution of dispersed phases Includes effects such as coalescence and break-up (S-Gamma and A-MUSIG)
 - **Mixture Multiphase (MMP) Model:** Light weight model compared to EMP. It model phase change such as wall boiling. Applicable to Fuel cells, Steam generators, Boilers.
 - **Volume Of Fluid (VOF) Model:** Used to track the motion of free surfaces of immiscible fluids with a sharp interface. Application are Marine Hydrodynamics and Seakeeping, Fuel Tank Sloshing, Oil and Gas Flow Assurance, Engine Cooling.
 - **Fluid Film Model:** Used for modeling a thin layer of fluid on surfaces. Thickness stored on the surface rather than resolved. Fluid Film can capture rivulets and surface tension effects and model phase change such as evaporation and condensation, Melting and solidification. Typical applications are Vehicle Rainwater Management, Selective Catalytic Reduction (SCR), Fuel Sprays, Spray Coating / Deposition, Aircraft Ice Protection. Used in conjunction with the morpher for modelling applications such as ice accretion. Solid matter in the film is removed and the boundary morphed outwards to account the solid.



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

- **Lagrangian Multiphase (LMP) Model:** Droplet splashing and rebound at walls Primary atomization and secondary breakup Evaporation, condensation and reactions used for applications Water management, Spray coating, Erosion, Liquid Fuel Combustion.
- **Dispersed Multiphase (DMP) Model:** Used for dilute Eulerian dispersed phases for applications Vehicle Water Management, Aircraft Icing, Sand Ingestion. DMP is Analogous to Lagrangian Multiphase.

- **Solid Particle Flow Model (DEM):** Software should offer Discrete Element Method (DEM) numerical method in the same GUI and license to simulate motion of many interacting discrete objects that are typically solid particles. Applications of granular flows includes Sand, Powders, slurries.

DEM is compatible with Chemical Reactions (Both Heterogenous, Homogenous), Electromagnetics and Electro Chemistry.

- **Combustion and Reactive Flow models:** Software offers Flamelet (Flamelet Generated Manifold, Steady Laminar Flamelet and Chemical Equilibrium, Turbulent Flame Closure, Coherent Flame Model), and Reacting Species Transport (Complex Chemistry, Eddy Breakup, Thickened Flame, Eddy Contact Micromixing, Polymerization).

Also, software has models for Emissions to simulate pollutant species, such as Soot, NOx Thermal, NOx Prompt, and NOx Fuel. Reactive Channel models to simulate reactive process that occur within long narrow tubes. Surface Chemistry models for Heterogenous reactions. Interphase to simulate reactive solid particles and fluid droplets.

Chemical reactions are compatible with Discrete Element Method (DEM).

- **Heat Transfer:** Capable of predicting heat transfer by conduction, convection and radiation very accurately.

Also, ability to handle multiphase flow situations involving Boiling, Condensation, Evaporation, Conjugate heat transfer, Heat exchangers etc. Ability to model heat transfer in Shell 3D cases like de-fogging, de-icing etc. in addition to multiphase capability.

Ability to predict effect of various parameters on flow and heat transfer situation using Adjoint solver under same GUI.

- **Radiation:**

Software offers wide range of radiation models

- S2S Radiation model
- Surface Photon Monte Carlo (SPMC) model
- DOM Radiation model
- Participating Media (Spherical Harmonics)
- Volume Photon Monte Carlo (VPMC) model

- **Motion:** Motion modelling capability such as Rigid Body Motion, Morphing (deforming mesh), Dynamic Fluid Body Interaction (DFBI),



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

Solid Displacement, User Defined Vertex Motion compatible with all available physics models.
Moving reference model, Virtual Disk Model, Blower model, Fan momentum source model.

- **Over Set:** Capability of handling multiple regions overlapping using Overset grid compatible with all available physics models for all Regions.
- **Zero Gap modelling:** CFD have the matured feature to model the Zero gap between the two bodies in a simulation
- **Dynamic Fluid Body Interaction (DFBI) 6DOF:**

DFBI (Dynamic Fluid Body Interaction) module to simulate the motion of a rigid body in response to pressure and shear forces the fluid exerts, and to additional forces defined by user. Software calculates the resultant force and moment acting on the body due to all influences and solves the governing equations of rigid body motion to find the new position of the rigid body.

Ability to provide External Forces and Moments such as Fluid Force and Moment, Gravity Force, External Force Acting on the Centre of Mass, External Moment, External Force, External Propulsion Force, Torsional Spring Moment, Damping Moment, Damping Force, Centrifugal Force and Linear Spring Force.

Robust and faster DFBI motion solver available to apply where balance of forces and moments exist and are function of position such as Marine sink and trim simulations.

Following DFBI motions are available:

- DFBI Rotation and Translation
- DFBI Embedded Rotation
- DFBI Morphing
- DFBI Superposed Rotation

8. Fire & Safety Management

CFD software offers fire and smoke wizard which is an automatic simulation tool for simulating a building fire.

Its capabilities for this application include :

Fire regions and sources

- Soot sources
- Velocity inlet boundaries for ventilation
- Fire doors
- Heat and smoke detectors

9. Modeling FSI in CFD software



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

Ability to handle linear static and dynamic analysis using Finite Volume and Finite Element Method using strong coupling under same GUI. Tool, capable of handling Sparse Matrix Solvers for Load, Constraints and Tensors.

- Software offers Finite Volume (Eulerian frame) structural solver which is the most successful, versatile and best-established discretization method in Computational Fluid Dynamics (CFD) and Finite Element (Lagrangian frame) which is equally successful, versatile and established for structural mechanics
- CFD software combines both methods to offer the most comprehensive solution for partitioned FSI.

10. CAE Coupling

- Software has Co-simulation capability either by file-base coupling or 2-way coupling.
- Co- Simulation is possible both within the tool and external of tool as well to couple with 3rd party solver.
- Ability to perform communications for geometry modification during optimization or DoE studies between the CAD package and CFD tool.
- Ability to perform cross platform communications of above geometry modifications between CAD package and CFD tool.

11. Boundary Conditions

Tool supports all standard boundary conditions with customization as and when needed by user.

- Types
 - Inlet – mass flow, velocity, stagnation, free stream.
 - Outlet – pressure, flow split, mass flow.
 - Special BCs: Wall, Axisymmetric axis, Overset mesh, Symmetry plane, Thermal network boundary.
 - These conditions can be customised as Constant, Table (time), Table (iteration), Table (x, y, z), Table (x, y, z, time), Field Functions etc.

Interfacing between regions can be done using any of following interface type.

- **Interface Types**
 - Internal interface
 - Contact interface
 - Baffle interface,
 - Blower interface,
 - Fan interface,
 - Fluid film interface
 - Fully developed interface
 - Mixing plane interface
 - Porous baffle interface.
- **Interface Topology Types**
 - In-place
 - Periodic
 - Repeating

12. Post Processing



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of Education. Govt. of India)

PROJECT PURCHASE SECTION Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026

CFD software has following capabilities and features for fast and effective post-processing.

- Ability to have fully interactive, editable, customizable GUI for post-processing results.
- Tool has features to render images, plots, contour plots by choosing best available graphics card.
- Ability to view Geometry (CAD, Surface mesh, Repaired Surface mesh, and Volume mesh), Mesh (Surface mesh, Repaired Surface mesh, and Volume mesh), Scalars, Vector, and Stream lines on complete regions as well as derived parts.
- Ability to create Section, Point & Line Probes, Iso-surface, Cell surface, Streamline, Constrained streamline, Vortex core, Threshold, Resampled volume, Warp as derived parts.
- Sections may be plane, cylinder, sphere, constrained plane, arbitrary. Probes may be point line presentation grid arbitrary. Warp may be Scalar or vector.
- Calculation of user defined (Custom) Reports on either complete regions or derived parts.
- Ability to monitor and plot reports with real time in unsteady and steady cases.
- On screen mouse-based view adjustment, manipulation such as translation, rotation, Zoom in, Zoom out, and align view normal to X or Y or Z axes.
- On screen keyboard-based view adjustment like fit to window, align view normal to X or Y or Z axes, Rotation of view about a particular axis.
- Ability to check all valid mesh metrics like cell quality, Face validity, Volume change, Negative volume cells, Cell aspect ratio, etc.
- Ability to remove invalid cells. Also to visualized the removed invalid cells.
- Extensive hard copy options, Cell probing of data, Flexible adjustment of units.
- Annotations like time stamp, Iteration stamp, Time step stamp, any vector or scalar scene, any histogram or XY plot.
- Ability to create animations in standard formats like gif, avi.
- On screen approximate ruler to measure any arbitrary distances in a plane. Also on screen creation of arbitrary aligned section plane.
- Specific phase related post-processing, particle tracking and other multiphase related features.

13. File Export/Import & Input/Output

Software able to read out and read in data in all standard formats that are widely used across industries.

- Ability to export data in form of Mesh only, Mesh and Solution, Solution only on complete geometry as well as individual boundaries.
- Ability to import data in form of Mesh, Solution or in any other readable format on complete geometry or individual surfaces.
- Ability to write out scenes, plots, histograms, report values with real time monitoring with iteration and time step for Steady and Unsteady cases.
- Ability to export data from XY plots, histograms in standard csv format or excel readable format.
- Export of monitored minimum, maximum values and fluxes of mass, heat and chemical species, force and moments.
- Post-processing of time variant data, for example Time –averaged, RMS, FFT, Mean, Sum, Max, Mean, Co-Variance, Variance.

**भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद**

धनबाद, झारखण्ड, भारत, पिन-826004

(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

**INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004****(An Institute of National Importance under Ministry of Education. Govt. of India)****PROJECT PURCHASE SECTION** Phone: (0326) 223 5203 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

File no. ME-PRJ-006-26-27

Date: 7th May 2026**14. On-Line Help & Documentation**

- Help manual highlighting installation procedure, OS compatibility information, How to Use, Working with Tool.
- Complete on-line documentation
- User guide, including underlying theories and applications
- Tutorial guide, with model-specific examples
- User-defined functions manual
- Text user interface manual
- Validation manual
- Online access to the User service centre.

15. Design Manager

CFD software must have an in-built feature Design Manager under the same GUI that provide all users with an automated, integrated and streamlined workflow to perform

- CAD robustness studies, Manual or Parameter sweeps studies (Design parameters and Simulation Parameters)
- Optimization, DOE and Robustness & Reliability studies with Intelligent Design Exploration with add-on license

16. Unlimited Parallel Computation:

Software should offer a license that allows user to run on unlimited cores of CPUs and GPUs