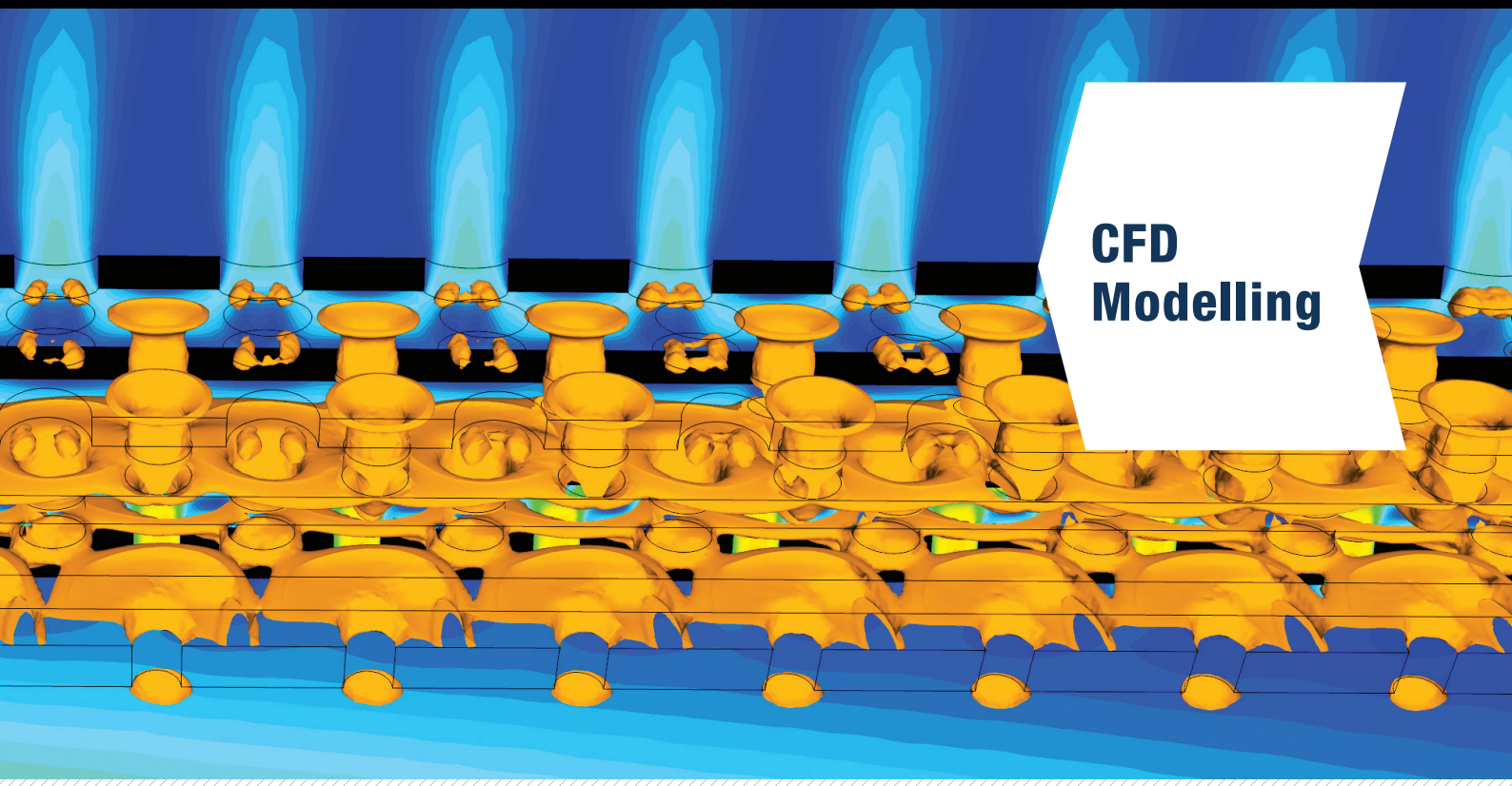
ivitas®
PROJEKCE

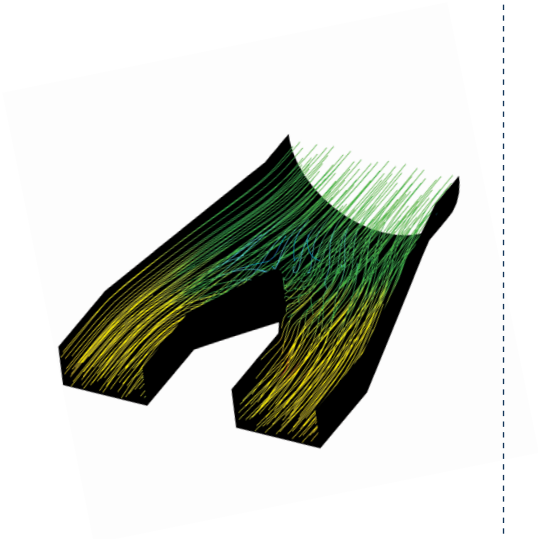


CFD Modelling

» Maximise the operating efficiency and reliability of your power generation equipment with cost effective CFD modelling

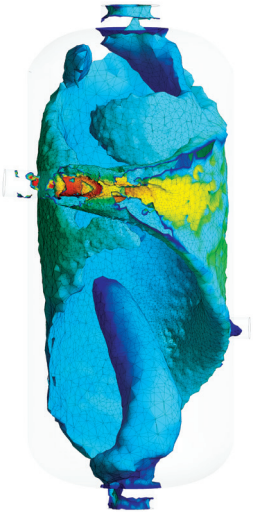
In today's competitive power generation industry, it is crucial for your equipment to function efficiently, reliably and for the lowest cost. Computational Fluid Dynamics (CFD) modelling from IVITAS helps you achieve this goal.

IVITAS has been designing and engineering equipment for the energy sector for almost 20 years and utilises this know-how to offer you a comprehensive CFD modelling solution for designing new power generation equipment or optimising your current equipment. CFD modelling is increasingly used in the power generation field to analyse the complex fluid and gas flow before, during and after combustion to help design equipment which functions with the highest efficiency. The use of this modelling technology saves you time and money when used to identify and solve any problems you are having with your power generation equipment or any modifications you wish to do to make it run more efficiently.



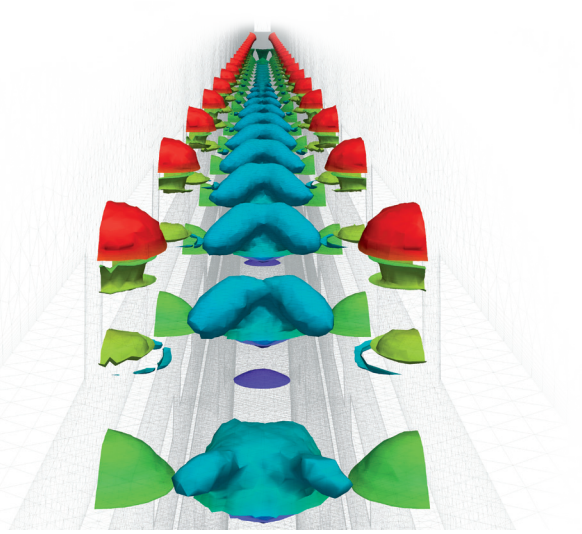
Flue gas pipe

Optimisation of flue-gas velocity distribution. Colours show streamline velocity.



Start-up Expander Tusimice II Power Plant

Optimisation of expander capacity. Colours represent the range of velocity values on swirling strength isosurfaces.



Silencer

Calculation mesh of model and pressure isosurfaces in the 1st and 2nd diffuser stage. Colours illustrate steam density on pressure isosurfaces.

Using the state-of-the-art CFD modelling software ANSYS FLUENT™ and experienced software operators, IVITAS assures that your equipment is optimised according to the most advantageous parameters which allow your equipment to operate in the most efficient manner and with the lowest operational cost.

CFD modelling from IVITAS allows for the designing, testing and confirmation of parameters of your new equipment before it is even created. We are in partnership with you and will explain exactly how your equipment will function, how efficiency will be increased and how much money you will save before investing in production.

From creating the model, to the engineering, to delivery of the final production plans, IVITAS offers you a complete and comprehensive CFD modelling solution

Uses of CFD modelling

- Design evaluation
- Optimisation of current or new equipment
- Identifying and solving problems with existing equipment
- Performance evaluation
- Flow of gas or ventilation systems
- Combustion systems
- Scale-up evaluation

Advantages of CFD modelling

- Accelerated development time of new products
- Fewer physical prototypes – reduces cost, time and guesswork
- Eliminates the need for physical modifications
- Identifies problems and solutions quickly and efficiently
- No actual changes made to your existing operations – saving time, expense, and disruption
- Improved quality and reliability
- Fewer failures and problems when implementing newly designed equipment
- Effectively and reliably predicts performance BEFORE system modification or installation
- Exact and detailed information about design parameters and equipment operation
- Pre-installation testing of fuels, equipment, and accessories
- Identify problems in an existing design so more efficient and cost-effective solutions can be engineered
- Types of modelling:
  - Mixing, dispersion, and flow dynamic modelling
  - Fuel combustion
  - Pollutant formation (i.e. NOx, SOx, LOI, CO, etc.)
- Types of fuel:
  - Coal – an extensive variety of grades
  - Biomass
  - Oil
  - Natural gas
- Types of Boilers:
  - Pulverised fuel boilers with different burners
  - Circulating Fluidised Beds (CFB)
  - Stoker units

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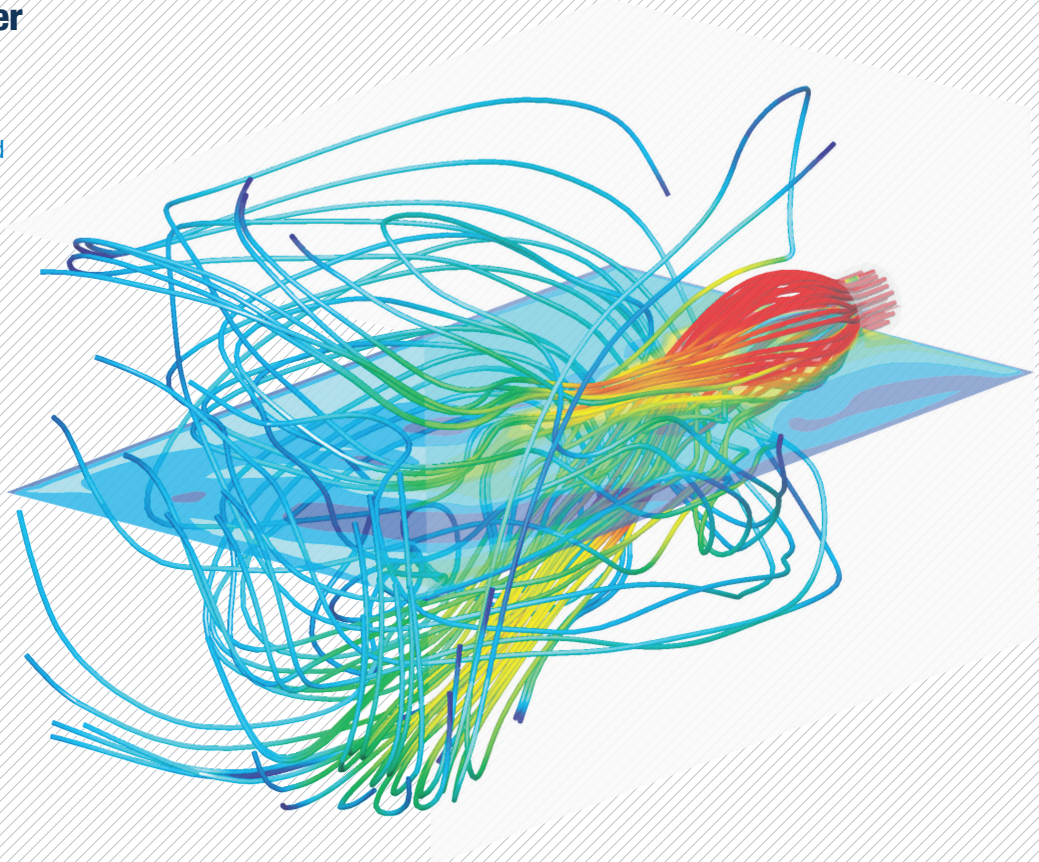
Newly developed Pulverized Coal Burner from IVITAS R&D

Environmentally-friendly pulverized coal burner for pulverized coal-fired boilers. Colours show streamline velocity.



Uses of CFD modelling in the energy sector

- **Heat exchangers** – modelling of heat transfer in the heat exchanger
  - Prevention of restricted flow in pipes
  - Optimisation of exchange layout
  - Fine tuning of diameters and spacing between the pipes to minimise pressure loss and maximise heat transfer
- **Flue** – modelling the flow of combustion flue in problematic areas
  - Minimisation of fouling and pressure drops
  - Design of suitable internal rectifiers
- **Silencers** – aero-acoustics
  - Effective reduction of noise emissions from output pressure
  - Optimisation of the damper with more efficient operating parameters
- **Dampers** – modelling flow through the air valve or flue
  - Improvement of regulation
  - Reduction of leakage
- **Simulation of pressure distribution** – for propeller blades, turbines or windmills
- **Modelling flow in the tanks**
  - Cooling tanks
  - Sedimentation tanks

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