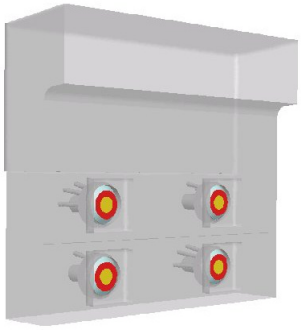
Computional Fluid Dynamics Modeling

What is Computational Fluid Dynamics Modeling and Why is it Used?

Computational Fluid dynamics modeling (CFD) is a widely utilized numerical technique used to solve the continuity equations for fluid flow and heat transfer applications. Once limited, it's use has now become widespread and it's application has broadened across engineering disciplines.

CFD modeling is increasingly used as an economic means of evaluating fluid systems for design, troubleshooting, and research purposes. Perhaps the most significant contribution of CFD modeling, is allowing the engineer to perform parametric analyses on numerous configurations without the expense associated with laboratory or field testing. Variations in hardware and operating parameters can be easily evaluated during the design process, or for troubleshooting purposes.

3-D Aerodynamic Windbox Model



What are it's applications?

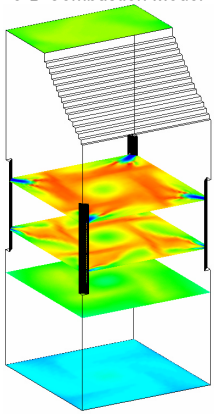
CFD modeling is used to model complex fluid systems for the purposes of troubleshooting, design, research and development purposes. Applications include modeling burner, furnace, and duct aerodynamics, particle distribution and fall-out, combustion kinetics, chemical reactions, and heat transfer (including evaporation). Modeling has been used in the design of burner hardware, windbox and ducting, emissions control systems (OFA, IFGR, FGR), chemical/reagent injection, stack flow and particulate fall-out modeling, along with many additional applications.

Why STEP Combustion?

STEP Combustion boasts over 10 years of experience in CFD modeling of complex fluid dynamic, aerodynamic, thermodynamic, and reaction kinetics modeling. Our experience includes a multitude of projects including:

- ☑ Windbox, Burner, and Duct Aerodynamics
- ☑ Combustion Modeling
  - Oil
  - Gas
  - Solid Fuels
- ☑ Particle/droplet mixing, distribution
- ☑ Reagent injection (Distribution, Evaporation, and Reaction Chemistyr)
- ☑ Thermodynamic models

3-D Combustion Model



Successful applications have ranged from simple two-dimensional flow models to complex chemistry 3-d systems containing well over 1,000,000 elements (cells). In addition to extensive experience with the numerical methods utilized, **STEP Combustion** provides field and modeling experience, a voluminous library of proprietary information (Spray characterization, Reaction chemistry and kinetics) and real-world application experience (Model validation).

As with many numerical techniques, the key to accurate results using computational fluid dynamics is dependent not only on the accuracy of the input data but also an understanding of both capabilities and limitations of the calculations. **STEP Combustion's** extensive experience with modeling, design, field implementation, and verification makes us uniquely suited to provide accurate, insightful, and realistic results.

Please contact us for more information or to discuss your specific application.

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