

*Xfh*<sup>®</sup> *Ultra* as a CAPE-OPEN unit operation  
developed using COBIA

# About HTRI

- Leading supplier of heat transfer research and software
- Consortium with over 900 member companies worldwide
- Standalone programs for heat transfer equipment
  - Shell-and-tube heat exchangers (*Xist*®)
  - Air coolers (*Xace*®)
  - Fired heaters (*Xfh*® *Ultra*)
- Use with process simulators important for membership

# About *Xfh*<sup>®</sup> *Ultra*

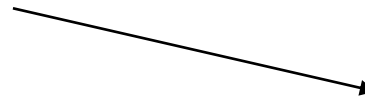
- HTRI's standalone fired heater modeling program
  - Heat transfer and pressure drop
  - Fuel consumption and efficiency
  - Peak tube temperatures and heat fluxes
  - Flue gas draft
- User interface: WPF / C# / .NET
- Calculation engine: Native C++

# Fired heater connectivity

- Flue gas stream (out)



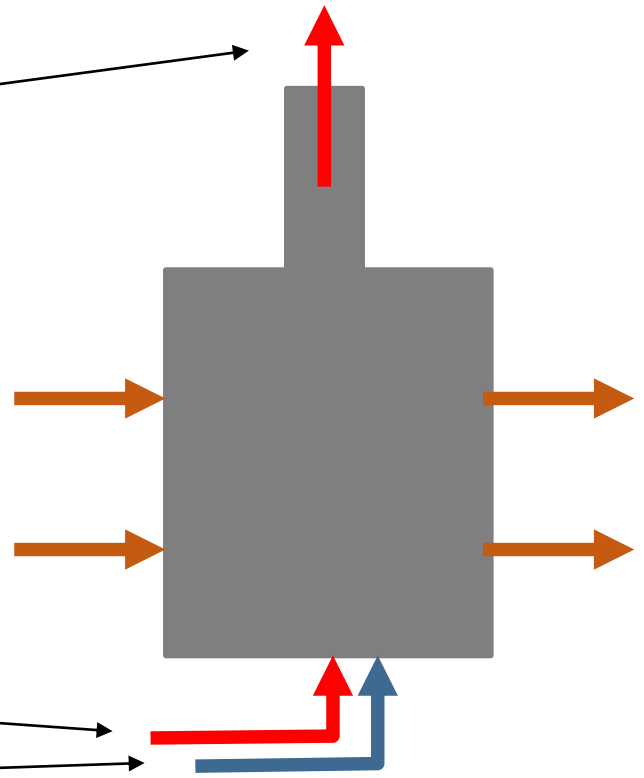
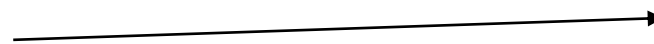
- N Process streams (in / out)



- Fuel stream (in)



- Combustion air (in)



# DEMO

# PMEs and process simulators investigated

- COFE (32-/64-bit)
- Petro-SIM<sup>®</sup> (32-/64-bit)
- AVEVA<sup>™</sup> PRO/II<sup>™</sup> Simulation (32-/64-bit)
- ProMax<sup>®</sup> (32-/64-bit)
- UniSim<sup>®</sup> Design Suite (32-bit)

# Lessons learned

- *Xfh Ultra*: Rigorous fired heater calculations in PMEs
  - Several process simulators tested*
- COBIA: Good ease of coding
  - With advice from Jasper*
- COBIA: Good backward compatibility
  - (i.e. with current process simulators)*
- .NET: Native interop challenges
- Limitations on calculation specifications
  - Handling of fuel
  - Outlet stream specification



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