LOGEfuel

Provides detailed and reduced reaction schemes to help you model the combustion of different fuels.
LOGEfuel also offers the capability to compose tailor made surrogate fuels based on known quantities.

LOGEfuel reaction schemes describe the oxidation and emission formation of various representative fuel mixtures (surrogate fuels). These multicomponent schemes are developed to model combustion features such as ignition delay time or laminar flame speed and are also able to predict the formation of emissions such as soot precursors, NO_X or unburned hydrocarbons.

LOGEfuel includes surrogate fuel models for

- Hydrogen and Syngas
- LPG (Autogas)
- Gasoline
- Diesel
- Dual fuel solutions (e.g. Diesel / Gasoline)
- Common oxygenated fuels, e.g. from renewable sources, are or can be included

Features include

- Build up chemistry for poly-aromatic hydrocarbons compatible with common soot models
- Fast laminar flame speed table generation: for a given multicomponent mixture tables can be generated for a wide range of pressures, temperatures, fuel equivalence ratios and EGR levels
- Reaction schemes in a detailed and/or reduced state, all non-stiff and available in ASCII standard format
- Mechanism reduction strategy targeted specifically for engine conditions
- Compatibility with all LOGE products and common CFD solutions

Properties	Target	Surrogate
RON	95	95
LHV [MJ/kg]	40.1–41.8	41.0
Ethanol [vol %]	5	5
Aromatics [vol %]	35	34
Density [kg/L]	0.72–0.78	0.74

Properties of EN 228 E5 and a gasoline reference fuel containing: 5% ethanol; 34% toluene: 15% n-heptane and 46% iso-octane.

LOGEfuel allows you to take regional variations of fuel compositions into account. For example the LOGEfuel Gasoline scheme contains the 4 reference fuels: n-heptane, iso-octane, toluene and ethanol. This makes it possible to take regional variations (ethanol, aromatic species) in the fuel into account while main fuel properties are well predicted.

LOGEfuel Diesel and Natural gas contain detailed description of heavier and gaseous fuels.

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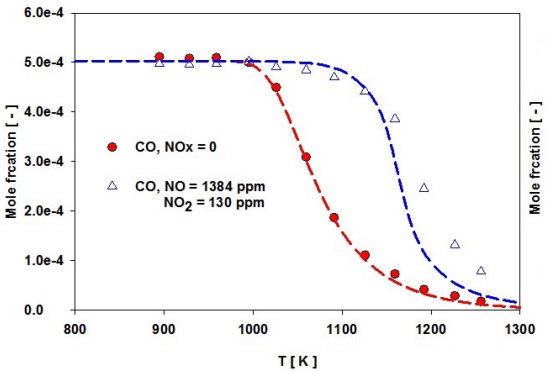
LOGEfuel contains a set of well validated fuel data for reliable multi-fuel/multicomponent reference fuels.

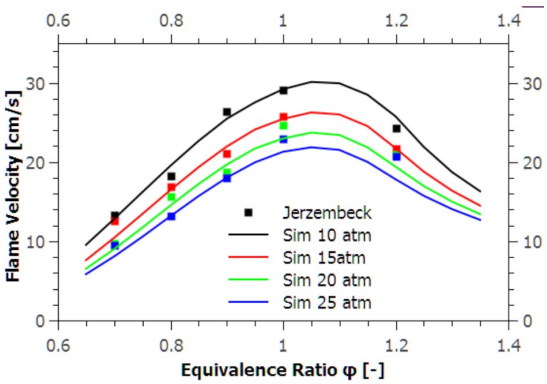
The Variable Chemistry Concept of LOGEfuel enables merging of mechanisms for different fuels

- A well validated H_2 / C1-C5 chemistry serves as foundation for larger fuels
- All fuels (see table below) are validated against published experiments in various configurations such as:
  - > Shock tubes >> Ignition delay
  - > Jet stirred reactors >> Intermediates and emission
  - > Laminar flames >> Flame speed
  - > Burner stabilized flames >> Intermediates and emission

This approach allows the formulation of complex reference fuels e.g. gasoline with varying ethanol content or diesel/bio-diesel mixtures including a detailed description of natural gas combustion.



Predicted and experimental Speciation of CO/NO/O_2/H_2O/N_2 oxidation in flow reactor. Exp from Glaborg et al. 1995.



Predicted and measured laminar flame speeds for PRF 87 / air at 373 K and different ambient pressures. Experiments from Jerzembeck et al 2009.

Available fuels

Group	Chemistry	Reference fuel for
Oxygenated	Methanol, Ethanol, Propanol, Formaldehyde, Acetaldehyde, Dimethylether, Acetone	Gasoline, Bio fuels
Mono-aromatics	Toluene, Benzene, m-Xylene, n-propylcyclohexane	Gasoline, Diesel, Jet fuels
Large aromatics	a-Methylnaphalene	Diesel, Jet
Linear alkanes	n-pentane, n-hexane, n-hexene, n-heptane, n-decane, n-dodecane	Gasoline, Diesel, Jet
Branched alkanes	iso-butane, iso-butene, iso-pentane, iso-octane, iso-dodecane	Gasoline, Diesel, Jet
Large Esther	Methyldecanoate	Biodiesel
Other small fuels	Hydrogen, CO, Methane, Ethane, Ethylene, Acetaldehyde, Allene, Propyne, Propene, Propane	Natural gas, Biomass, Gas to Liquid, Synthesis Gas
Emissions	NO_x, polyaromatics, soot, unburned HC, aldehydes	Combinable with all fuels