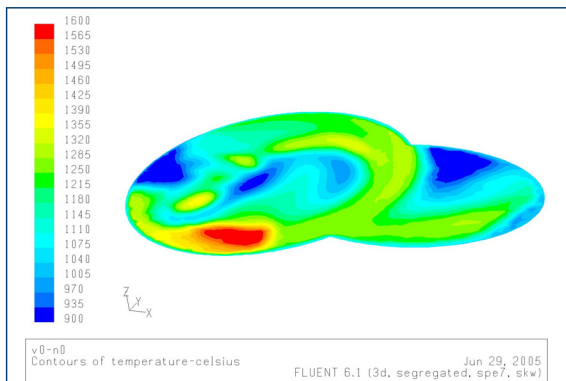


Gasification at FORCE Technology



Temperature plot inside a gasifier mixing chamber



Gasification of biomass for power production has become a proven technology with a high potential for substituting existing conversion technologies based on fossil fuels. The advantages of employing gasification are:

- Economical benefits of CO₂-neutral power production
- High efficiencies, suitable for small to medium scale CHP plants
- Utilise biomass or waste products for power production.

The available gasification technology of today is characterized by a number of small manufacturers, with

limited commercial success of their specific technologies. However, some technologies are now mature and commercially feasible.

FORCE Technology - your partner

FORCE Technology has been active for several years in the development and maturing of different gasification designs. Because FORCE Technology is independent of a specific technology or gasifier supplier, we can assist you in the comparison of technologies and on the choice of supplier based on technical, environmental and economical criteria. We have the expertise to help you in every phase of installing a gasification plant from idea through engineering to verification and optimization.



We offer you:

- **Project consultancy.** We can help you analyse your needs and perform feasibility studies on investing in a gasifier plant. We will assist you in formulating the specifications and requirements for a complete gasifier plant and help you decide on the best suitable technology.
- **Engineering.** FORCE Technology has years of experience in engineering of biomass fired power plants including gasification plants.
- **Measurements.** Our comprehensive laboratory at FORCE Technology will assist you in all measuring needs including gas analysis in situ, fuel characterization and analysis of ashes.
- **Troubleshooting.** With our years of experience with the gasification processes we can assist you in troubleshooting or optimization of existing gasifier plants. For this our experienced engineers are able to employ a number of tools such as mathematical models, CFD models, laboratory tests and on-site diagnostics tools.

How do we supply all that?

FORCE Technology has worked with combustion for more than 85 years and has several years of experience with gasification. We have dedicated engineers working with combustion and gasification. We have experience ranging from the practical supervision of a gasifier to the most sophisticated computer modelling.

Our test equipment includes a comprehensive laboratory for analysing and characterizing of fuels, gases and ashes. The laboratory is an Accredited National Service approved by the Danish Government. Furthermore we offer a wide range of measurements on-site including a semi-online analysis of the produced gasification gas using a CP-4900 MicroCG Gas Chromatograph. We can analyse the energy and mass balances of a system and analyse inorganic materials in ashes and fuels. Computer modelling tools include advanced Computational Fluid Dynamics (CFD) for designing and optimizing a gasifier reactor.

FORCE Technology has been and still is involved in numerous R&D projects ranging from networking in international forums to engineering and verification of a full-scale demonstration plant. Some current projects are:

- "Liftoff": 2 MW demonstration plant of a three-stage gasifier
- "LT-CFB": Tests on 500 kW pilot plant
- "Green Fuel Cells": Create a gasification gas suitable for use in SOFC Fuel Cells.

FORCE Technology has a large international network and is committed to work with international partners and customers. FORCE Technology is a representative for Denmark in the International Energy Agency Task 33 "Thermal Gasification of Biomass".



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