



CATIA SYSTEMS ENGINEERING THERMAL POWER LIBRARY

*MODEL AND OPTIMIZE THERMAL
POWER SYSTEMS WITH CATIA OR DYMOLA*



OPTIMIZE THE DESIGN AND PERFORMANCE OF THERMAL POWER PLANTS

The Modelica based Thermal Power Library (TPL) enables the fast and accurate modeling and simulation of thermal power plants including steam and combined cycle power units. It facilitates the rapid development and verification of innovative as well as conventional plant concepts and their associated control systems.

DESIGN OPTIMIZATION

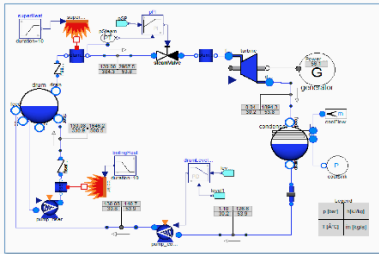
The Thermal Power Library is well suited for the simulation of both transient and steady state operation using the same model. For transient operation, powerful capabilities exist to analyze in detail the plant start-up, shut-down and load rejection scenarios to verify that the control system handles and fully manages these situations.

In addition to covering the entire steam cycle, TPL also enables the rapid modeling and simulation of the flue gas side of thermal power plant, including a wide range of after-treatment technologies such as desulphurization, NOx-removal and CO2 Capture Systems.

TYPICAL APPLICATIONS

• Rankine Cycle

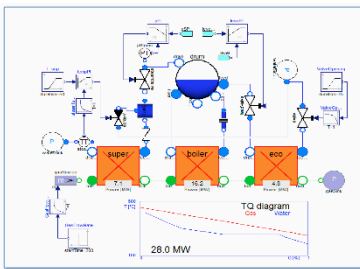
Modeling and simulation of Rankine cycle thermal power plants using water as the working fluid.



Simulation model of typical closed steam cycle

• Heat Recovery Steam Generator

The HRSG is basically a counter-flow heat exchanger composed of a series of super-heater, boiler and economizer sections positioned from gas inlet to gas outlet to maximize heat recovery from waste heat and supply the rated steam flow at the required temperature and pressure.



Simulation model of single pressure Heat Recovery Steam Generator



Blades from a typical thermal power plant steam turbine

KEY FEATURES

- Enables both dynamic and steady state simulation in the same model
- Wide range of components, correlations and media models
- Well suited for control systems design and validation
- Fully compatible with the Modelica Electric Power library for operation validation of the complete plant and its control systems development
- Different plant designs and their respective dynamic behavior can be studied early in the concept design phase

LIBRARY CONTENTS

Water side/steam components

- Steam turbines, boilers, pumps
- Pipes, valves, volumes, separators

Fuel gas components

- Pipes, valves, volumes, combustor, fan

Heat exchangers

- Heat transfer correlations

Generator

- Simple generator model

Media

- Media packages for defining mixture properties

BENEFITS

- Time taken to analysis plant behavior is significantly reduced due to the flexibility and power of the thermal plant simulation models
- Accelerates the creation and analysis of multiple design iterations in order to reach an optimal system design
- Full support for real-time simulations

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