

SIMple® is a powerful set of computational components designed for Altair Activate for modeling and simulation of accurate and high performance physical and logical dynamic systems. It has been used in the last decade to develop high-fidelity simulators of thermal powerplants for large multinational companies, such as Électricité de France and Petrobras, and individual components for a military vessel simulator for the Brazilian Navy. One SIMple® component can be used either as a single model or connected to other components to carry out modeling, calibration and real time simulation of systems, from single equipment to large plants. It is divided in three libraries for different scopes of simulation: SIMple® Thermal, SIMple® Control Systems and SIMple® Power Systems.

Meet SIMple® Thermal

SIMple® Thermal is a library developed for more than 10 years by a specialist team of mechanical and computational engineers to meet the needs of professionals who design and simulate thermal and hydraulic processes. The library was created to be the main *engine* of a thermal powerplant *Full Scope Simulator*, a high-fidelity tool for real time simulation, operator training and engineering analysis that is ruled by a strict international standard of quality that defines a broad range of criteria for performance, maximum deviations, best practices and usability, with the main purpose of characterizing a tool that can be used to recreate a system through physical simulation.

+ 10 years of development	REAL time simulation	56 components – and growing!
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SIMple® Thermal was built in compliance with this standard and has already been used by SIMple® team to develop large thermal powerplant simulators systems with high accuracy. Now, it's been made available for **everyone** through Altair Activate, a multi-disciplinary system simulation software that offers great usability and a large set of features to the final user. Within Altair Activate, SIMple® Thermal has got as easy as a drag and drop to build any system. With 56 components and its own proprietary solver, there's a wide range of lightweight models from small pumps and valves to complex equipment such as turbines, condensers, drums and boilers.

Valves



**Boundary
Conditions**



Storage



Heat Transfer



Mechanical



Drivers and driven



Sensors



Coolers and heat exchangers



Combustion



Every component in SIMple® Thermal library is developed fully based on physical principles, what makes it suitable for trivial to even the most demanding applications – where accuracy and precision are mandatory. It's also extensively parametrizable to fit the equipment the user needs to model and simulate.

The screenshot displays the 'Gas Turbine' parameter dialog box. At the top, there is a schematic diagram of a gas turbine with four ports: 'in' (top left), 'out' (top right), 'mIn' (bottom left), and 'mOut' (bottom right). Below the diagram, the dialog box has four tabs: 'Initial Conditions', 'Parameters' (selected), 'Output', and 'Inputs'. The 'Parameters' tab contains the following settings:

Parameter	Value
Number of Expansion Stages [-]	1
Designed Pressure Ratio [-]	10
Designed Polytropic Efficiency [%]	95
Designed Air Mass Flow Rate [kg/s]	0.45
Hydraulic Diameter [m]	1
Heat Transfer Area [m ²]	4
Metal Shell Mass [kg]	100
Metal Shell Specific Heat [kJ/kg]	0.4
Heat Transfer Coefficient between Ambient and Metal Shell [kW/Å°C]	0.0005
Plenum Volume [m ³]	400
Type	'Gas Turbine'
<input type="checkbox"/> Import parameters from file?	
selected_file	0
Parameter File	'myfile.txt'

At the bottom of the dialog box, there are three buttons: 'Apply', 'OK', and 'Cancel'.

Do you want to know more?



Talk with our specialists about the library and get to know it in more detail! Feel free to contact us and we will be happy to help you.

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Next story: stay tuned to our publications and get to know **SIMple® Control Systems** next week! Following us will also make you eligible to have access to demos, use cases developed by our team and special offers!



Do you think this content may be of special interest of a friend? Feel free to forward this publication!