

# AFT Fathom Modules

Extended System Modeling for AFT Fathom 7.0

Building on the most comprehensive piping system modeling software for incompressible flow systems, the *AFT Fathom*™ modules extend modeling capabilities into three areas –

- **XTS**—eXtended Time Simulation to model dynamic system behavior
- **GSC**—Goal Seek and Control to automate the determination of input values that will yield desired output values and simulate control functions within systems
- **CST**—CoST calculations of pipes and components

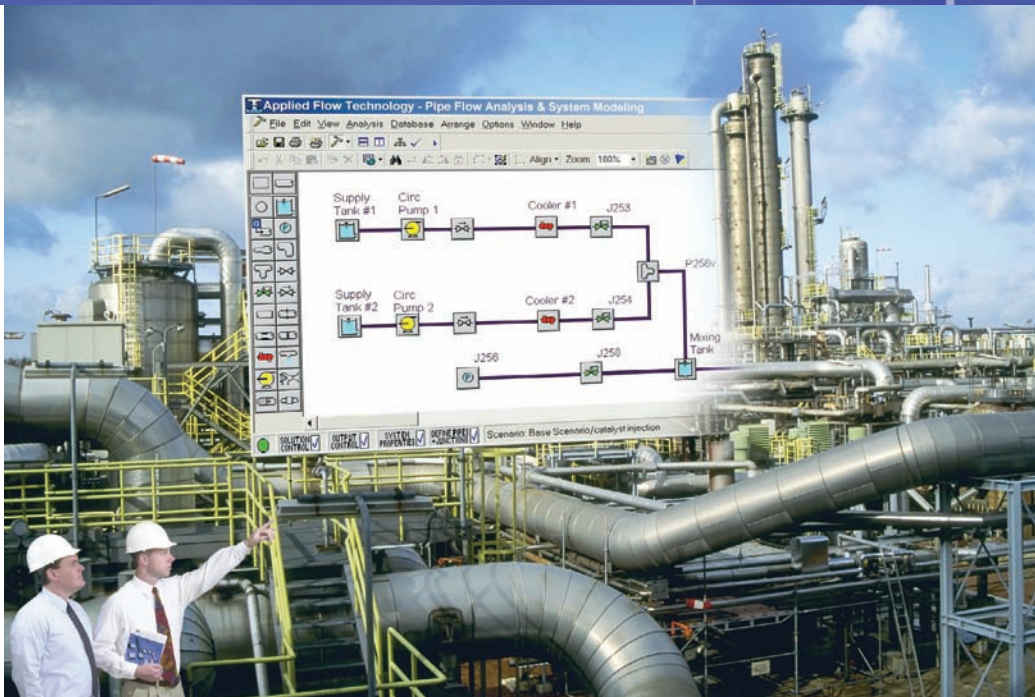
Each of the *AFT Fathom* modules can work individually or together within *AFT Fathom*. And, since they are add-on modules to *AFT Fathom*, they can work with all of your existing system models.

## Extended Time Simulation XTS Module

While steady-state analysis answers many design and operating simulation questions, some questions simply cannot be answered without knowing how critical parameters vary over time. The *AFT Fathom* XTS module extends your piping system modeling capabilities into the fourth dimension of time by performing a series of steady-state solutions with variables changing automatically through time to achieve a dynamic simulation of your system. For example, the XTS module allows the user to define the geometry of a tank which is used to determine liquid level changes with time.

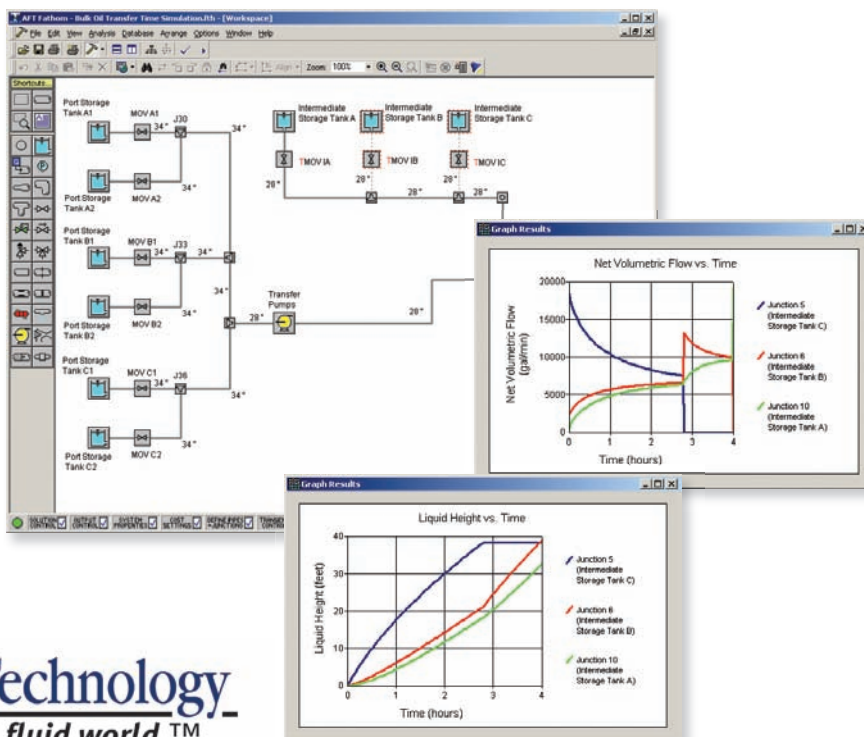
More than simply calculating time varying values, the XTS module lets you define a wide range of actions to occur during the time simulation, including:

- Pump start/stop and speed variation
- Valve position changes
- Control valve setpoint variation

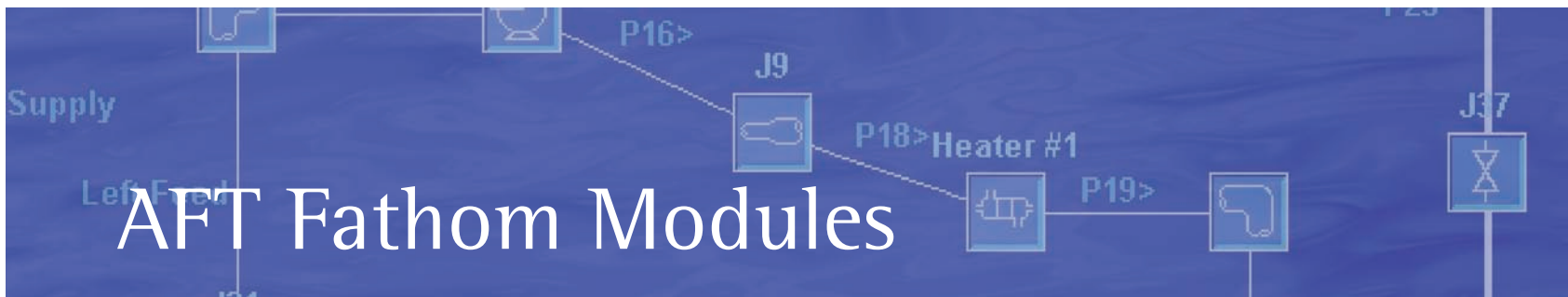


Extensive text and graphical output clearly displays time varying parameters such as liquid height in tanks, flow and pressure in pipes, pump operating conditions, valve position and more. Graph Results now includes a unique animation feature that dynamically displays time varying parameters along selected flow paths.

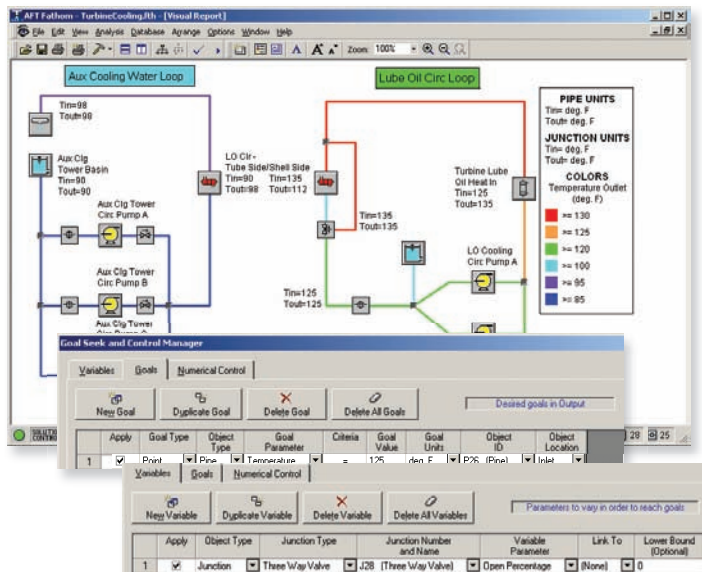
Whether you're designing a new system, a modification to an existing system or evaluating operating scenarios, when time varying performance is important to your project, you'll find the XTS module uniquely suited to your requirements.



**Applied Flow Technology**  
Dynamic solutions for a fluid world.™



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## Goal Seek & Control GSC Module

One of the powerful benefits of system modeling is the what-if potential, the ability to quickly evaluate the effects of changing system parameters. The *AFT Fathom* GSC module automates this process for piping systems so that it requires much less time than traditional, manual iterative analyses. To determine what valve open percent will achieve a target flow is as easy as choosing the valve loss value as a variable and specifying the desired flowrate as a goal.

That's only the beginning, as the GSC module's sophisticated goal seeking engine allows you to define multiple variables and goals at multiple locations throughout the system. A goal can be single point, differential or sum. The GSC module answers questions such as: what pump speed will achieve a specified total flow to multiple, remote tanks or what positioning of multiple valves will yield a desired differential supply pressure between pieces of equipment in your system. The possibilities are almost endless and raise the productivity of your system modeling to new levels.

Modeling parameters that may be used as variables or goals include:

- Pumps—speed, flow, head rise, impeller diameter
- Valves—open percent, Cv/K, deltaP, flow
- Reservoirs—liquid level, temperature
- Control valves—setpoint, open percent
- Orifice—diameter, area
- Heat exchangers—heat rate, temperatures, area, U value
- Spray discharge—area, K value, exit pressure

## Cost Estimation CST Module

Most of the cost of the typical piping or ducting system is fixed in the initial stages of design where system sizing is determined. Traditional methods impose too much distance between this design stage and cost determination, obscuring the impact of design decisions on system costs. By calculating system costs, the *AFT Fathom* CST module lets you tightly integrate your design and cost estimating process, eliminating the barriers to development of cost effective designs. In conjunction with *AFT Fathom's* energy cost calculation capabilities, the impact of design decisions on both fixed and life cycle costs are clearly shown.

The CST module provides a flexible means of defining system component and piping costs in databases that may be accessed by your *AFT Fathom* model. In addition to the traditional hydraulic information, output now also contains the total cost and a cost breakdown by component. The CST module databases provide the freedom to arrange your cost data as you want, whether it be by

component type, equipment category, project or almost any arrangement that fits your needs.

Database Manager lets you easily move data between databases, create new databases and manage the data used in your system model.

If you're serious about developing cost effective designs, you need the tight integration between your design and its cost provided by the CST module.

### System Requirements

- Windows 98 or higher or Win 2000 or higher
- 64 MB RAM
- 800 x 600 display minimum
- Stand-alone or network



### For more information contact:

Applied Flow Technology  
2955 Professional Place  
Suite 301  
Colorado Springs, CO 80904  
USA

Phone: 800-589-4943 / 719-686-1000  
Fax: 719-686-1001  
E-mail: sales@aft.com  
website: www.aft.com

Table Units:	Type	Name	Material	Installation	Non-Recurring Sub Total	Operation/Energy	TOTAL
<b>TOTAL OF ALL MODEL COSTS</b>							
<b>Total of All Shown Costs</b>			<b>418,593</b>	<b>693,729</b>	<b>1,112,322</b>	<b>2,751,887</b>	<b>3,864,210</b>
<b>Pipe Subtotal</b>			<b>291,480</b>	<b>622,560</b>	<b>914,040</b>	<b>0</b>	<b>914,040</b>
P100	Pipe	Circ Pump 1A Suction	354	895	1,209	0	1,209
P101	Pipe	Circ Pump 1A Disch	708	1,710	2,418	0	2,418
P102	Pipe	Supply 1	60,000	129,000	189,000	0	189,000
P103	Pipe	LO Clr 1 In	210	480	690	0	690
P106	Pipe	LO Clr 1 Out	210	480	690	0	690
P107	Pipe	Cond 1 In	2,900	4,275	7,175	0	7,175
P108	Pipe	Cond 1 Out	2,900	4,275	7,175	0	7,175
P109	Pipe	Return 1	60,000	129,000	189,000	0	189,000
P110	Pipe	CT 1 Hdt A	1,600	3,860	5,460	0	5,460
P111	Pipe	CT 1 Hdt B	1,096	2,800	3,896	0	3,896
P112	Pipe	Riser 1/1	900	2,060	2,960	0	2,960
<b>Pump Subtotal</b>			<b>114,347</b>	<b>50,149</b>	<b>164,495</b>	<b>2,751,887</b>	<b>2,916,382</b>
J101	Pump	Cooling Tower 1 Circ Pump A	28,587	12,537	41,124	687,972	729,096
J102	Pump	Cooling Tower 1 Circ Pump B	28,587	12,537	41,124	687,972	729,096
J201	Pump	Cooling Tower 2 Circ Pump A	28,587	12,537	41,124	687,972	729,096
J202	Pump	Cooling Tower 2 Circ Pump B	28,587	12,537	41,124	687,972	729,096

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