

QMax Delivers the Best Steam Tracing System for Heavy Crude Operations



QMax FTS (Fluid Tracing System) uses a patented, custom-fit, highly conductive aluminum channel to markedly improve heat transfer from steam into process, significantly increasing efficiency and decreasing wasted energy associated with steam tracing. By using highly conductive aluminum, QMax FTS transforms the nature of standard stainless or copper tubing from inefficient convective heat transfer to high-efficiency conductive heat transfer. The heating surface area is also increased to as much as three inches per tracer to further increase heat transfer. This delivers substantial capital and maintenance cost savings and improves reliability and performance. Hunt Refining, PBF Energy, Chevron, Exxon Mobil, and Marathon have all successfully implemented QMax FTS.

"QMax has supplied a unique design that delivers better heat transfer and improves heat tracing benefits when compared to typical installations. The QMax product is also easy to use and fairly simple to install."

**– James Rawson
Reliability Manager
Hunt Refining Company**

Thermal FEA Modeling

QMax Industries, Inc. performs thermal FEA (Finite Element Analysis) on all steam tracing applications to model the temperature profile of a system before it's put into service. This analysis allows QMax to:

- > Predict potential failure modes
- > Maximize performance and
- > Guarantee thermal performance

Many different scenarios can be analyzed to improve the effectiveness and /or efficiency on a project. Customary advantages of QMax FTS include:

- > Heat-up and/or melt-out time of the process is decreased dramatically
- > Cold spots are eliminated
- > Poor insulation is less problematic
- > Steam Traps are reduced by 50% or more (less potential for failure)
- > More energy is driven to the process instead of lost through insulation

QMax FTS vs Bare Tracers

Bare tracing is convective in nature which means the heat energy must transfer through air, a great insulator. Below are two images from QSim, our proprietary Thermal Finite Element Analysis program, that model (3) bare tracers and (4) bare tracers in flowing conditions.

Using (3) Bare Tracers

QSim FTS- Fluid Thermal Analysis for Heating Pipe		
	Bare Tubing	
Energy Transfer Into Process	-27.4	Btu/hr ft
	-26.3	W / m
Heat Load on Heating Medium	157.0	Btu/hr ft
	151.0	W / m
Steam Consumption	0.140	lb / hr ft
	0.208	Kg / hr m

Using (4) Bare Tracers

QSim FTS- Fluid Thermal Analysis for Heating Pipe		
	Bare Tubing	
Energy Transfer Into Process	22.9	Btu/hr ft
	22.0	W / m
Heat Load on Heating Medium	212.3	Btu/hr ft
	204.1	W / m
Steam Consumption	0.140	lb / hr ft
	0.208	Kg / hr m



QMax Industries, Inc. is a technology company based in Charlotte, NC, with several patents in the field of process heating.

Our specialties include:

- >High Performance Steam Tracing
- >High Performance Electric Tracing
- >Equipment Jacketing
- >Tank Heating

"We're committed to be the world leader in steam tracing technologies"

**Thomas W. Perry
President**

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QMax FTS (Fluid Tracing System)

This specific analysis reflects a requirement of maintaining heavy oil temperature at 130°F inside a 24 inch carbon steel pipe using 175 psig saturated steam using bare steam tracing. It assumes a cold climate and the use of 2 inches of fiberglass insulation around the piping system. The top number represents the heat transfer from the steam into the process.

Notice that a single tracer with QMax FTS far exceeds the heat transfer of (4) bare tracers. We recommend using two QMax FTS tracers on large lines, as this offers automatic system redundancy in case of steam trap failure. If the ultimate goal is to eliminate as many steam traps as possible, a single QMax FTS tracer will maintain temperature.

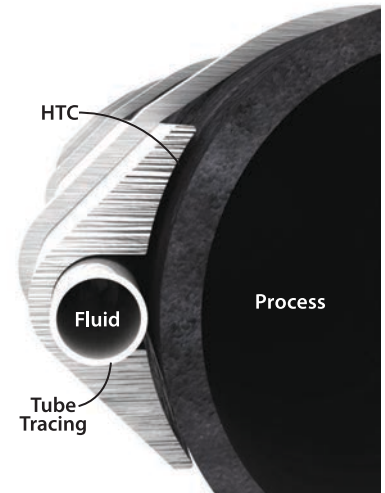
Using (1) QMax Tracer QMax FTS- Heat Load Calculations

Energy Transfer Into Process	=628.54	Btu/hr ft
	=604.25	W / m
Heat Load on Heating Medium	=847.8	Btu/hr ft
	=815.0	W / m
Steam Consumption	=1.000	lb / hr ft
	=1.484	Kg / hr m

Using (2) QMax Tracers QMax FTS- Heat Load Calculations

Energy Transfer Into Process	=1458.64	Btu/hr ft
	=1402.29	W / m
Heat Load on Heating Medium	=1705.0	Btu/hr ft
	=1639.1	W / m
Steam Consumption	=2.012	lb / hr ft
	=2.985	Kg / hr m

This example represents a specific scenario. QMax Industries, Inc. provides qualified customers with Technical & Economic Analyses to demonstrate how the patented QMax FTS steam tracing system can significantly reduce capital and long-term maintenance costs through the reduction of steam tracing requirements and related infrastructure.



QMax FTS (patented)* is a highly conductive aluminum channel that fits over standard stainless or copper tubing to maximize heat transfer from the heating medium to the process pipe. Field installation is quick and simple.

QMax FTS effectively increases process temperatures, yet is also energy efficient because it does not continue to add unnecessary heat energy into the process once operating temperatures are achieved.

Estimated Cost Savings

Companies that implement **QMax FTS** as an improvement to standard bare tracing realize significant capital and maintenance costs savings. The largest impact is the **reduction of steam and condensate infrastructure**. This example demonstrates the potential savings based on historical prices. The material savings alone more than offset the cost of the **QMax FTS** system. To run a more detailed analysis of savings, send us the unit prices that apply to your site specifications (for example, welded versus seamless tubing).

Material Savings*	Tubing	Fittings	Steam Traps	Pre-Insulated** Tubing
Input Unit Price	\$4	\$25	\$750	\$8
(4) Bare Tracers	24,000	1,200	160	8,000
(2) QMax Tracers	12,000	600	80	4,000
Potential Savings	\$48,000	\$15,000	\$60,000	\$32,000

*Labor not included

**Pre-insulated tubing is based on 50 ft lengths per circuit.

Total Savings: \$155,000



> Energy Savings

More heat energy is input into the crude instead of lost through insulation.

> Energy & Maintenance Savings

Fewer steam traps means fewer potential traps failed open or closed.

> Energy & Maintenance Savings

Less steam/condensate infrastructure means lower maintenance costs and less energy loss.