TRACER™

STS™ Skin-effect Tracing System



Tyco Thermal Controls

TRACER™

A Solutions Company

Tyco Thermal Controls, a division of Tyco Flow Control, provides complete heat tracing and heat management solutions to industrial, commercial and residential markets. Employing thousands of people around the world, Tyco Thermal Controls is the global heating solutions leader.

Worldwide Approach

Decades of experience and operations in 48 countries around the globe gives Tyco Thermal Controls the ability to support any project, anywhere, at anytime. Whether it is specialized products or turnkey construction services, Tyco Thermal Controls provides the solution.

The Tracer™ Brand

Since 1984, Tracer Industries has been widely regarded as the premiere provider of turnkey heat-tracing services and engineered product solutions in the industrial marketplace. Today, within Tyco Thermal Controls, the Tracer brand continues to signify excellence in complete engineering, design, project execution and maintenance services of heat management systems.

Tracer™ STS™ Skin-effect Tracing System

The Tracer STS System is a versatile engineered heat management system configured to deliver heat for medium to long pipelines. Applications include: material transfer lines, snow and ice melting, tank foundation heating, subsea transfer lines and prefabricated, pre-insulated lines. The industry leader in offering single source responsibility in heat management, Tyco Thermal Controls and the Tracer brand are uniquely qualified to offer Skin-Effect Systems that combine system engineered expertise with proven procurement/construction capabilities.

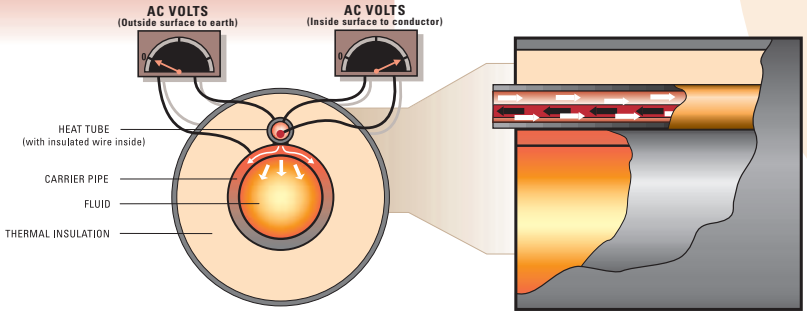
Engineered Solutions For Optimum System Performance

Each STS™ System is custom engineered to meet the highest performance standards

Tracer STS Systems can be designed for:

- *Circuit lengths up to 25 kilometers (15 miles)*
- *Power outputs up to 150 W/m (49.2 W/ft)*
- *Maintain temperatures up to 200°C (392°F)*
- *Exposure temperatures up to 250°C (482°F)*

STS Technology

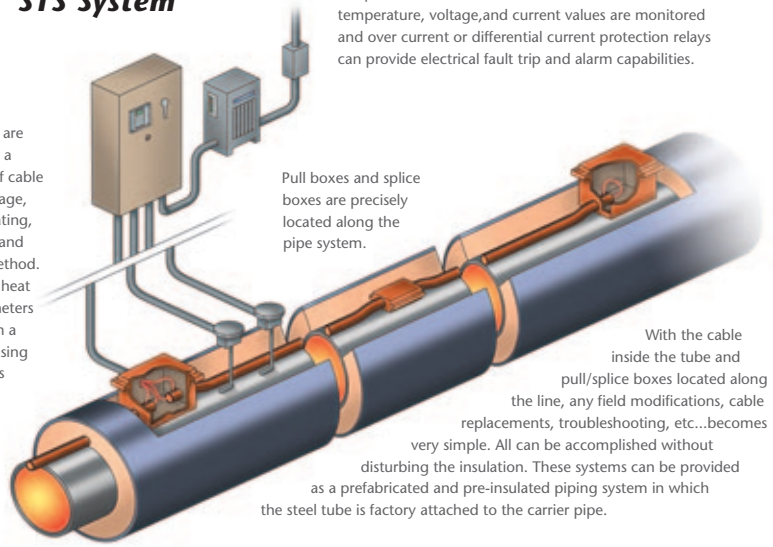


The Tracer STS System consists of a thermally rated, electrically insulated wire installed inside a ferromagnetic heat tube. The insulated wire is connected to the heat tube at the end termination, and an AC voltage source is connected between the heat tube and insulated wire at the power connection. AC current flows down the wire, returning on the inside surface of the tube. The STS system is electrically safe and produces heat in the ferromagnetic tube through the effects of two well-known electrical phenomena: Skin Effect and Proximity Effect. These phenomena cause the current flowing in the heat tube to be concentrated on the inner surface; the current concentration is so complete there is virtually no measurable voltage on the outer wall of the heat tube. Heat is also generated due to the resistance of the heat tube and STS wire, and through eddy currents and hysteresis in the heat tube. Since the heat tube is attached to the process pipe and completely within the thermal insulation system, heat is efficiently transferred into the process pipe.

STS System

Control of the system is accomplished by solid-state temperature controls with RTDs as sensors. Standard temperature, voltage,and current values are monitored and over current or differential current protection relays can provide electrical fault trip and alarm capabilities.

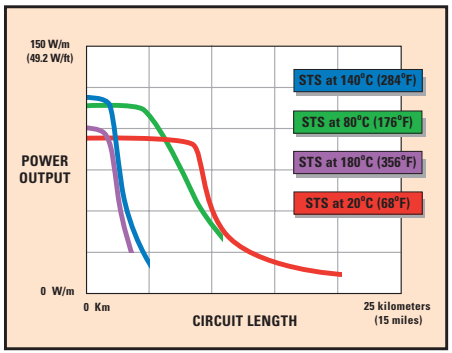
Circuit lengths are determined by a combination of cable size, cable voltage, temperature rating, heat tube size and attachment method. It is feasible to heat up to 25 Kilometers (15 miles) from a single source using supply voltages approaching 5,000 volts.



Pull boxes and splice boxes are precisely located along the pipe system.

With the cable inside the tube and pull/splice boxes located along the line, any field modifications, cable replacements, troubleshooting, etc...becomes very simple. All can be accomplished without disturbing the insulation. These systems can be provided as a prefabricated and pre-insulated piping system in which the steel tube is factory attached to the carrier pipe.

STS Performance



The power output, heat tube size, conductor size, and carrier pipe temperature determine the maximum allowable circuit length. The above illustration shows the relationship between power output and maximum circuit length for selected STS configurations.

Why Tracer STS?

Safe: Fully grounded system with zero electrical potential on pipe surfaces

Accurate Control: A closed loop control system includes redundant temperature sensing

Engineered: Systems are custom engineered in accordance with ANSI/IEEE 844, NEC 426/427 and plant standards

Maintainable: Pull/splice boxes simplify access to the system without disturbing insulation

Rugged & Reliable: Entire circuit is encapsulated within rugged heat tubes and steel boxes

Longline Capability: Circuit lengths up to 25 kilometers (15 miles) from a single power source

Simulation Studies: Temperature profile plotting capability

Computerized Design: Runaway temperature, dynamic static heat-up/cool-down calculations available

Flexibility: Ideal for either factory fabricated, pre-insulated or field installed system

Applications

MATERIAL TRANSFER LINES
Whether from dock to tank farm or direct to a process unit, the long circuit capabilities of the Tracer STS system provides the lowest cost and safest heat management system available.

SNOW & ICE PREVENTION
Sidewalks, people-moving platforms and airport ramps are examples of large critical areas demanding snow and ice prevention. By minimizing the number of circuits, Tracer STS provides a cost-effective solution to common snow and ice problems.

TANK FOUNDATION HEATING
Tracer STS can be used in Class 1 Division 2 and Zone 2 hazardous areas creating a technically superior, commercially-attractive solution to prevent frost heave damage of LNG, LPG, ethylene, propylene and ammonia tanks.

SUBSEA/SUBMERGED LINES
Emerging subsea technologies, including the development of integrated production umbilical (IPU®) and submerged pipelines, demand a precise solution to heating underwater transfer lines. With the Tracer STS pre-inserted wire/heat tube configuration, long lengths of wires are pulled in the heat tubes without having to use conventional pull/splice boxes or field splices.

PREFABRICATED PRE-INSULATED LINES
Tracer STS Technology is ideally suited for use with prefabricated, pre-insulated piping installations. These factory-fabricated systems offer energy efficiency improvements to the thermal envelope and facilitate field erection to significantly reduce total installed cost, improve system performance and compress critical project schedules.

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Flow Control

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