

**Industrial**

***tyco***

*Thermal Controls*

**Raychem®**



**TRACER®**

**DigiTrace®**

**Heat Tracing**



**Products and Services**

**tyco**

*Thermal Controls*

**A Solutions Company**

**Tyco Thermal Controls** is the world leader in heat-tracing products and solutions for the industrial, commercial and residential markets. Employing over 2,000 people globally, Tyco Thermal Controls has the experience and product breadth to meet your heat-tracing requirements.

**Worldwide Approach**

With operations in 48 countries and worldwide experience, Tyco Thermal Controls supports your project efforts anywhere, anytime. Whether it's top-notch products or turnkey services, Tyco Thermal Controls has the solution.

**The Market Demands—We Supply**

From Heat-Tracing Systems, Specialty Heaters and Floor Warming to Wiring, Temperature Measurement, and Leak Detection, we are able to offer innovative solutions worldwide. Furthermore, we proudly provide Turnkey Services for each—WORLDWIDE!

**Raychem®**



**TRACER®**

**DigiTrace®**



**isopod™**

**TraceTek®**



**Heat Tracing**



**Temperature Measurement**



**Wiring Products**



**Services**



**Leak Detection**



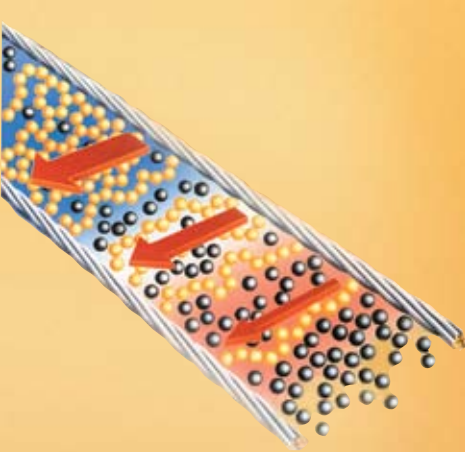
**Floor Warming**



**Specialty Heaters**







## ***We manage the heat you need™***

For every heat-tracing need, depend on the undisputed industry leader.

**Tyco Thermal Controls** stands as the world leader in heat-tracing solutions for the industrial, commercial, and residential markets. An innovative company, Tyco Thermal Controls offers top-notch products and turnkey services under such industry renowned names as **Raychem**,<sup>®</sup> **Tracer**,<sup>®</sup> **Pyrotenax**,<sup>®</sup> and **DigiTrace**.<sup>®</sup>

We offer the most complete line of heat-tracing systems and have manufactured over one billion feet of heating cable. As the inventor of self-regulating heat tracing, our **Raychem** brand is known for technical expertise in polymer science and radiation cross-linking—both critical parts of the process. Also an industry leader in the manufacture of mineral insulated cables, Tyco Thermal Controls is well known for its **Pyrotenax** brand.

Tyco Thermal Controls' **DigiTrace** brand offers the most complete line of heat-trace control and monitoring systems—from single circuit mechanical thermostats to multi-circuit, microprocessor-based networked systems. Our **DigiTrace** Supervisor software links your control and monitoring system back to a PC for centralized control system monitoring.

Our Services Division, is widely regarded as the premiere provider of turnkey heat-tracing solutions in the industrial market today. Offering turnkey engineering, design, construction and maintenance, **Tyco Thermal Controls** is capable of handling heat-tracing projects of any size and scope. By focusing on safety and utilizing the value-added capabilities made available by **Raychem**, **Pyrotenax**, **Tracer**, and **DigiTrace** products, **Tyco Thermal Controls** heat-tracing installations are timely, thorough, and cost-effective.

With operations in 48 countries and worldwide experience, **Tyco Thermal Controls** can support your project efforts anywhere in the world.



**Raychem**<sup>®</sup>

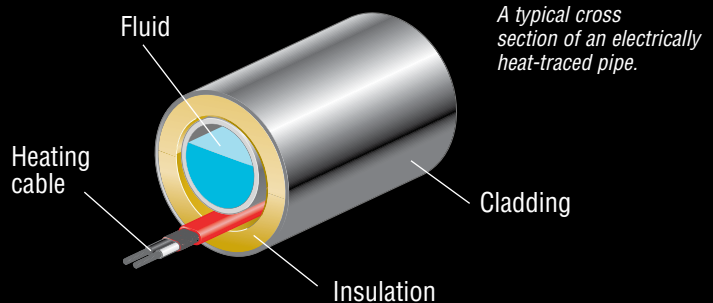
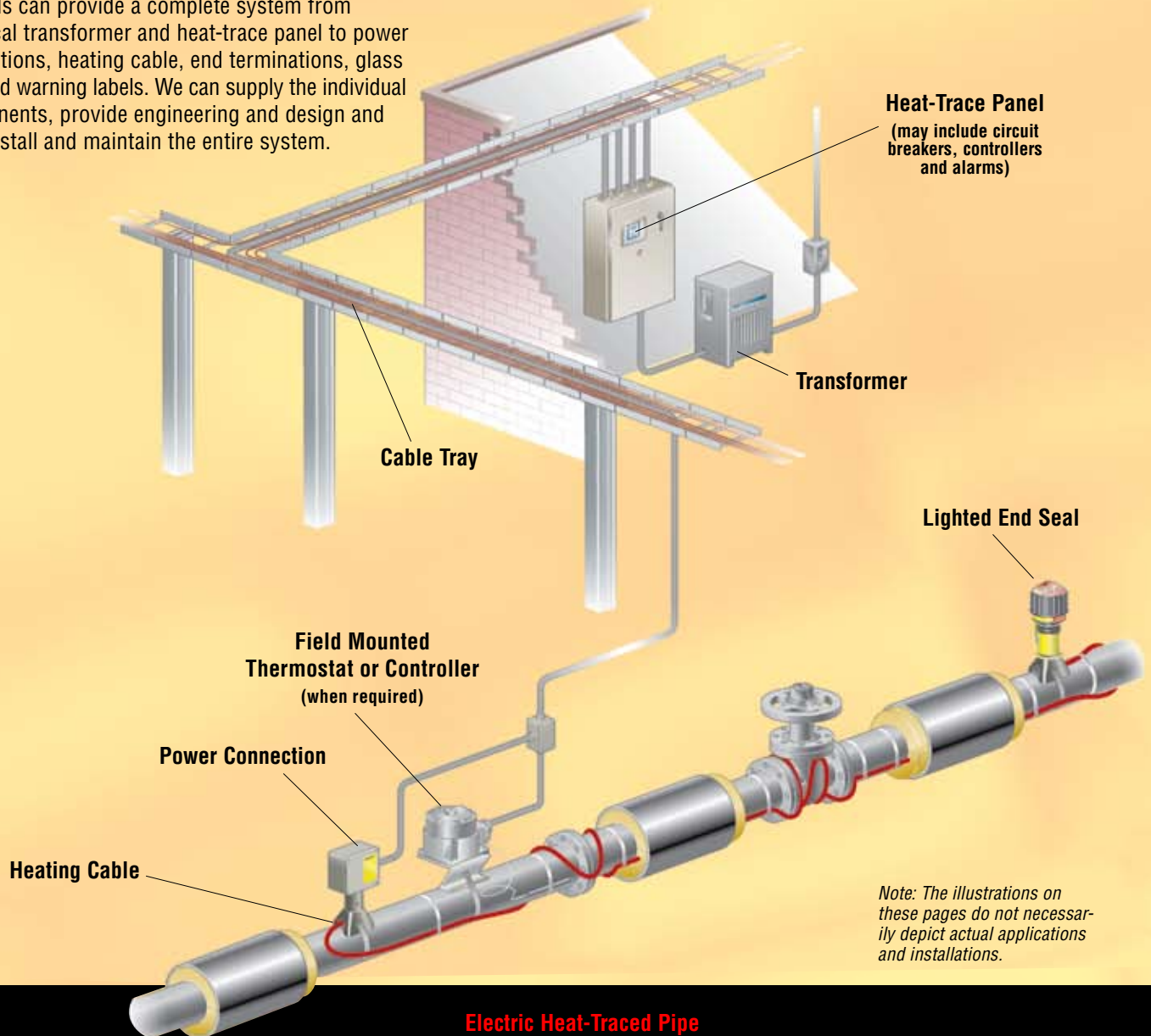


**TRACER**<sup>®</sup>

**DigiTrace**<sup>®</sup>

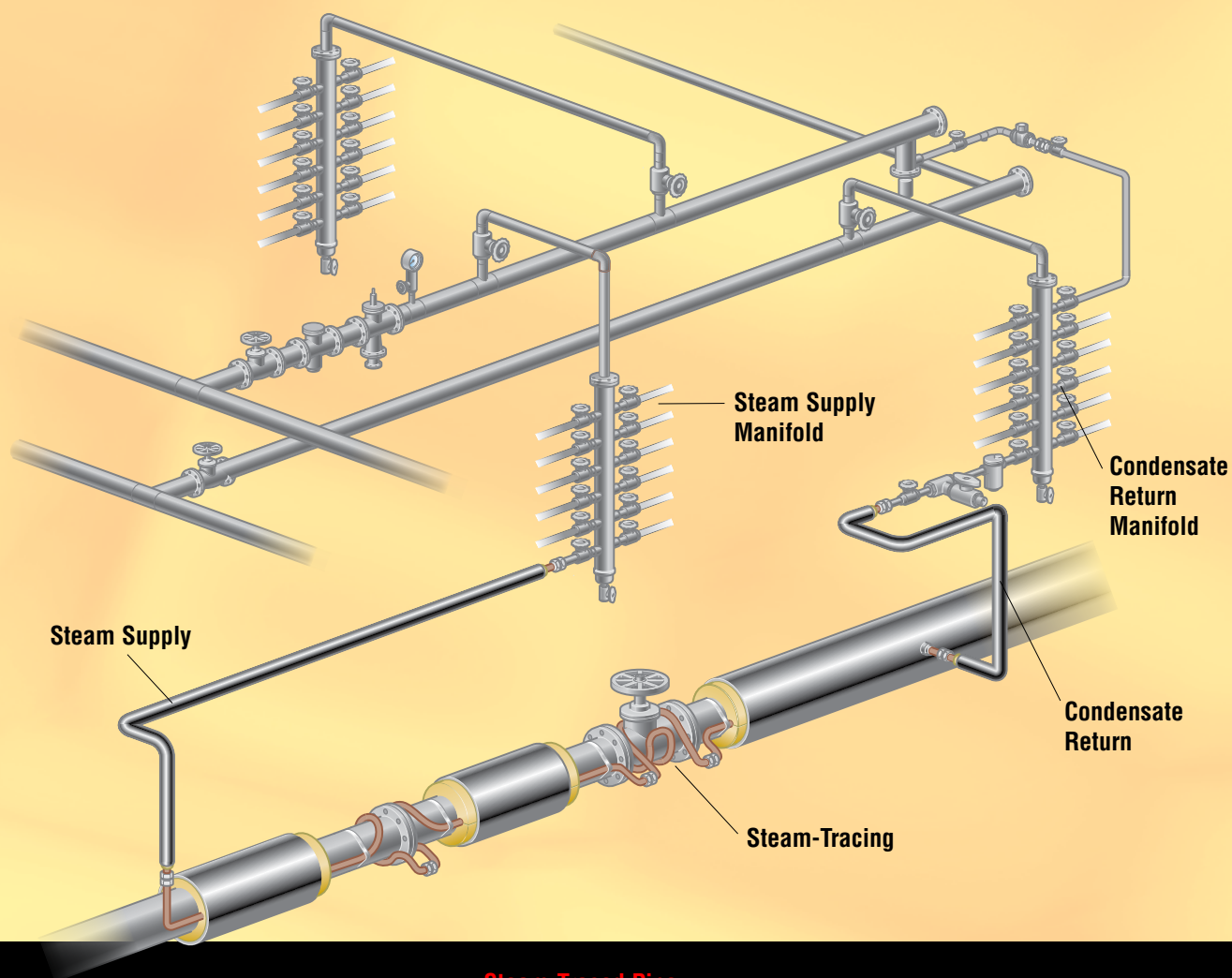
## Electric Heat-Tracing Systems

A complete electrical heat-tracing system is much more than just the heating cable. Tyco Thermal Controls can provide a complete system from electrical transformer and heat-trace panel to power connections, heating cable, end terminations, glass tape and warning labels. We can supply the individual components, provide engineering and design and even install and maintain the entire system.

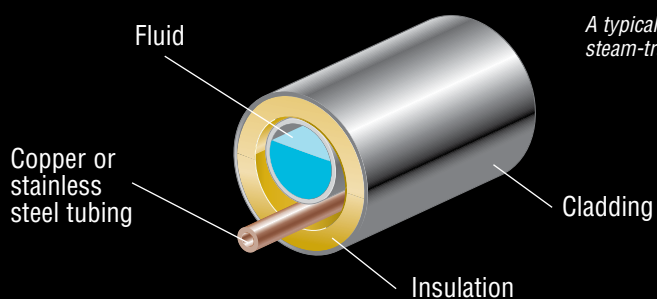


## Steam-Tracing Systems

A steam-tracing system may be chosen for a particular site or process consideration. A complete system can consist of a steam supply source, steam tubing, valves, traps, and return lines. Tyco Thermal Controls can supply a complete steam-tracing system from engineering, design, material supply and installation.



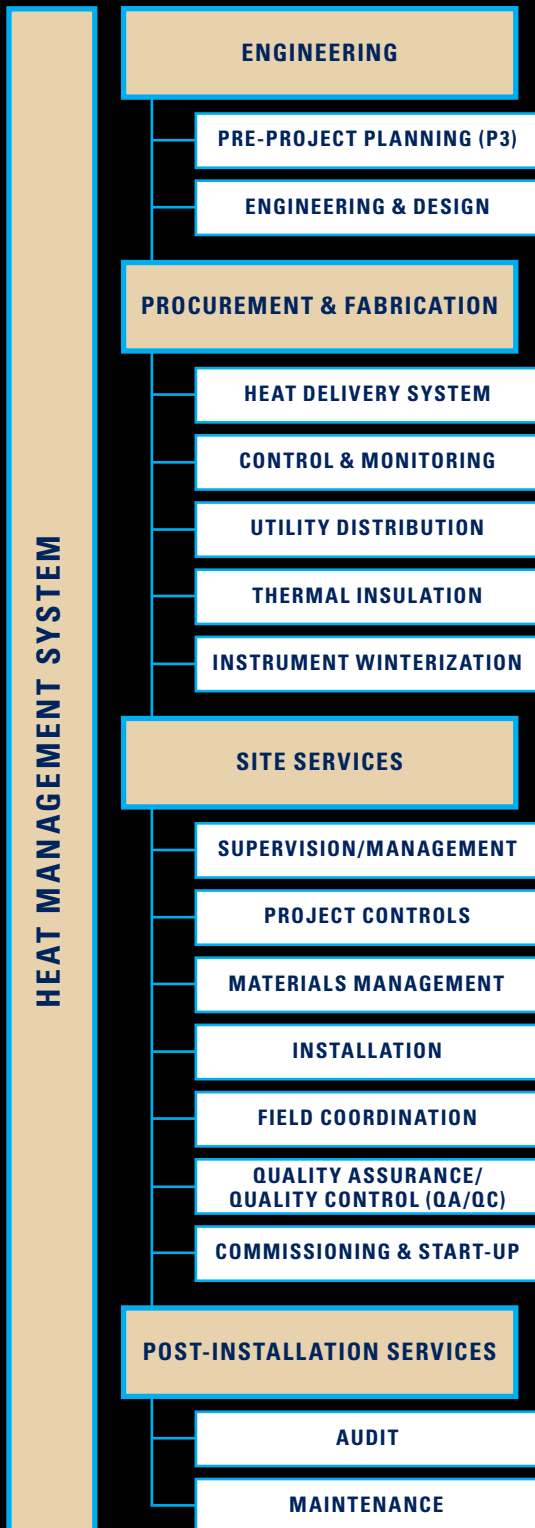
### Steam-Traced Pipe



*A typical cross section of a steam-traced pipe.*



## Services



***“Providing a heat-tracing system means more to us than just supplying a heat source for your application.”***

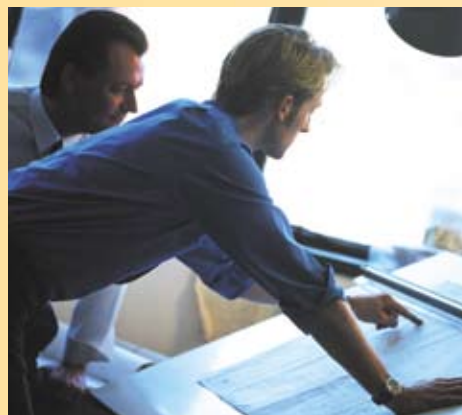
*A Heat Management System (HMS) is an engineered system designed to maintain or protect process piping, equipment, vessels and instrumentation at pre determined temperatures and within defined design criteria.*



### Engineering

We believe every project requires a solution-oriented mindset from a service/product provider. Through early involvement in the project cycle, we can offer optimization techniques to reduce the total installed cost of your heat-tracing system.

Tyco Thermal Controls designs Heat Management Systems using state-of-the-art design tools that standardize the engineering process and ensure that designs are optimized and executed in accordance with standard design processes and procedures.



Tyco Thermal Controls provides our customers with thorough turnover documentation at the conclusion of each project to make the hand-off from construction to operations as smooth as possible.

## Safety

Safety is our number one concern. We are recognized as a leader in the industry in safety performance by consistently challenging the norm through safety innovations including training and motivational programs.



Committed to safety  
through proactive safety  
management techniques.



***We manage the heat  
you need™***

## Procurement & Fabrication

Tyco Thermal Controls manufactures a wide range of heat-tracing products and components for the most demanding heat-tracing applications. We can order, ship and receive materials for you. Heat Management System components include:

- ❑ **Heat Delivery System** which is either electrically powered or transfers heat through re-circulating fluids such as glycol, steam or hot oil.
- ❑ **Control & Monitoring System** of the heat delivery system.
- ❑ **Utility Distribution System** which can be electricity, steam/condensate, hot oil, or glycol to the heat delivery system.
- ❑ **Thermal Insulation System** installed over the heat delivery system.
- ❑ **Instrument Winterization** in the form of pre-packaged instrument enclosures and pre-traced/pre-insulated tube bundles.



## Quality Assurance & Quality Control (QA / QC)

Tyco Thermal Controls' Quality Management System addresses all processes including the design, supply, installation, and commissioning to ensure your Heat Tracing System is operating as intended when commissioned.

## Site Services

Using Tyco Thermal Controls Site Services allows you to maintain a single point of responsibility and accountability through the entire Heat Management System process, and you ensure continuity of project knowledge from engineering through start-up. We can manage all the necessary services you need: Engineering, Procurement, Construction, Construction Management, Quality Assurance, or any variation thereof.

## Post-Installation Services

Initiating a Heat Management System audit, or implementing a maintenance agreement, provides you with the security of having your system regularly evaluated by experts in the heat-tracing industry, allowing timely resolution of potential system problems.



Comprehensive design  
capabilities include all  
aspects of electric and  
circulating fluid tracing  
systems



## Warm Pipe Warranty

By allowing Tyco Thermal Controls to handle all of the engineering, design, and construction of your heat-tracing system, we can provide you with a Warm Pipe Warranty, ensuring that the system operates as specified.



## Heat-Tracing Products



*Our industrial heating cables are backed by a ten-year extended warranty!*

*Tyco Thermal Controls offers the industry's most complete line of heat-tracing products to meet every need—for everything from pipe freeze protection to high temperature process maintenance.*



### SELF-REGULATING CABLES

*The preferred choice for most complex pipe-tracing applications.*



**Raychem BTV** cable provides freeze protection on metal and plastic pipes, maintaining temperatures up to 150°F (65°C) and withstanding exposure to 185°F (85°C).



**Raychem QTVR** cable provides freeze protection and process temperature maintenance, maintaining and withstanding exposure temperatures up to 225°F (110°C).



**Raychem XTV** fiber-wrap cable provides process temperature maintenance up to 250°F (121°C) and withstands intermittent exposures to 420°F (215°C).

### MINERAL INSULATED CABLES

*For high temperature applications.*

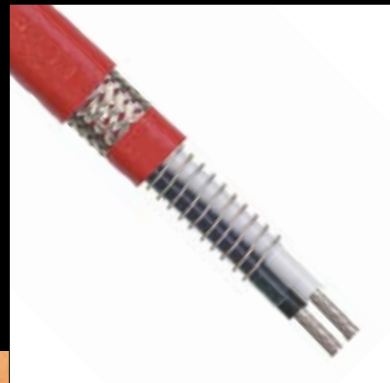
**Pyrotanax MI** cable maintains temperatures up to 1022°F (550°C) and withstands continuous exposure to 1200°F (650°C).



### POWER-LIMITING CABLES

*For applications exceeding the temperature range of self-regulating cables.*

**Raychem VPL** heating cable maintains temperatures greater than 300°F (150°C) and withstands continuous exposure to 500°F (260°C), power off.



*Note: These photos and illustrations do not necessarily depict actual applications and installations.*

**Raychem**



**TRACER**





## LOGLINE HEATING

Choose from the most complete selection of longline heat-tracing systems and technologies. Circuit lengths can vary from 500 feet (152.4 meters) to over 15 miles (24 kilometers):

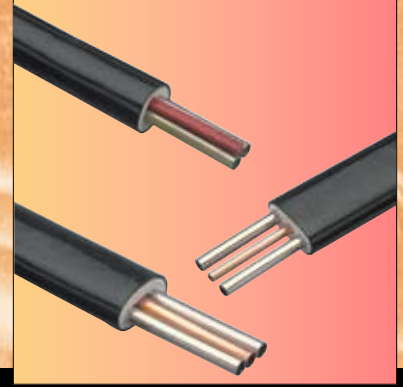
- **Raychem** Self-regulating systems, **LBTV**, **SLBTV** and **VL** cables
- **Raychem** Series resistance systems, **SC** cables
- **Pyrotenax MI** mineral insulated cables
- **Tracer STS** skin-effect system



## TANK HEATING

Choose from tank pad heaters and heating cables for tank and vessel heating solutions.

- The **Raychem RHS** tank heating system maintains tank temperatures up to 200° F (93°C). Heaters are available from 150 watts to 1,400 watts.
- **RHS-L** heaters can be used on polypropylene, FRP, and metal tanks.



## TUBING BUNDLES

**Raychem** tubing bundles (**RTB**) offer a cost-effective alternative to traditional field tracing and insulating.

- Pre-traced and pre-insulated tubing bundles for such applications as impulse, sample, and process lines
- Choice of single or dual tubing in stainless steel, monel, copper, PFA Teflon, or other materials
- Choice of electric or steam-traced bundles

## SNOW AND ICE PREVENTION

- **Raychem** self-regulating heating cables are installed in concrete to prevent dangerous icing on loading ramps, walkways, entrances, and driveways.
- **Raychem** heating cables are installed on roofs and gutters to prevent hazards and property damage caused by ice buildup.

Both systems automatically adjust their heat output in response to ambient temperatures, for better reliability and energy efficiency.

- **Pyrotenax** mineral insulated cables are installed in concrete and asphalt and provide a constant heat output.



## ADVANCED HEAT-TRACING COMPONENTS

**Raychem** power connections, tees, and splices are vital parts of any heat-tracing system. These high-quality advanced components are easy to install and will deliver reliable service. All install without a torch, heat gun, or messy sealants!

- Spring clamp terminals provide reliable connection and allow easy reentry.
- The power connection installs in less than 10 minutes, using only standard cable-stripping tools and a screwdriver.
- High-intensity LED lights are available with our power connections and end seals to provide visual monitoring of system power and continuity.



## Innovative Heat-Tracing Technologies

*Tyco Thermal Controls self-regulating and power-limiting systems consist of insulated electric heating cables with voltage applied to two parallel bus wires. This enables the cables to be cut to any length, then spliced and “teed” in the field.*

### SELF-REGULATING TECHNOLOGY

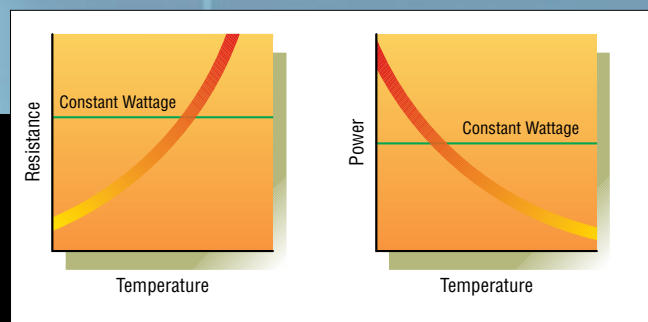
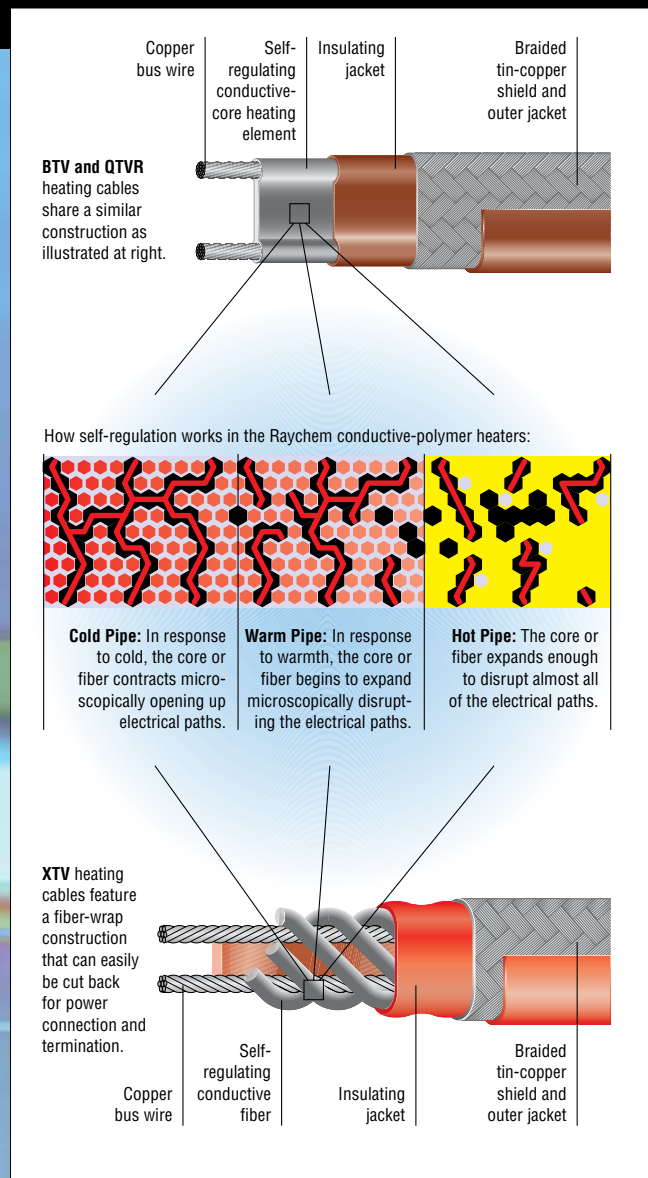
This technology was used in designing the two types of self-regulating, polymeric heating elements illustrated at right. In both the monolithic (solid core) and fiber wrap products, the heating element is made of polymer mixed with conductive carbon. This special formulation of materials creates an electrical path for conducting current between the parallel bus wires along the entire cable length.

In each heating cable, the number of electrical paths between the bus wires changes in response to temperature fluctuations. As the temperature surrounding the heater decreases, the conductive core or fiber contracts microscopically. This contraction decreases electrical resistance and creates numerous electrical paths between the bus wires. Current flows across these paths to warm the core or fiber.

As the temperature rises, the core or fiber expands microscopically. This expansion increases electrical resistance and the number of electrical paths decreases. The heater automatically begins to reduce its power output.



**Raychem®**

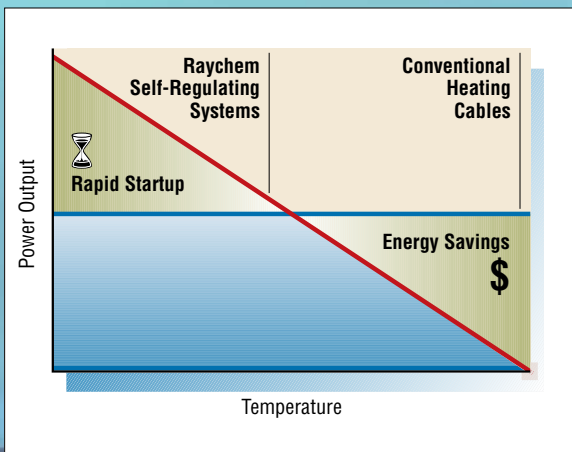


*The graphs above illustrate the response of self-regulating heating cables to changes in temperature. As the temperature rises, electrical resistance increases, and our heaters reduce their power output.*





## Tyco Thermal Controls self-regulating systems offer:



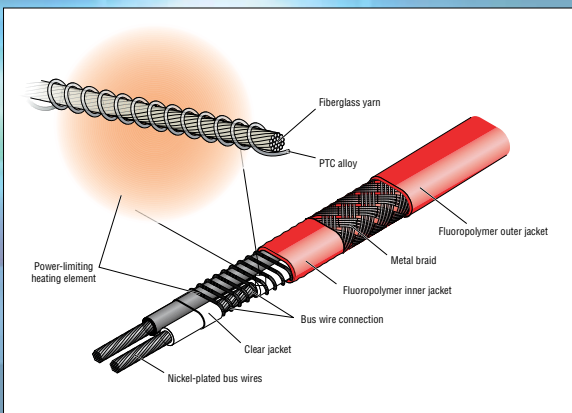
**Easy installation** Parallel circuitry and flat cable design makes Raychem heat-tracing systems easy to handle and install. They may be cut to length on site, and overlapped at valves, flanges, and instruments.

**Rapid start-up** Provides high power output as needed. This means fast start-up—and less downtime—when pipes or other application surfaces are cold.

**Reduced operating costs** The system compensates for variables such as heat sinks, as well as fluctuations in voltage and temperature. Heat is automatically supplied only when and where needed.

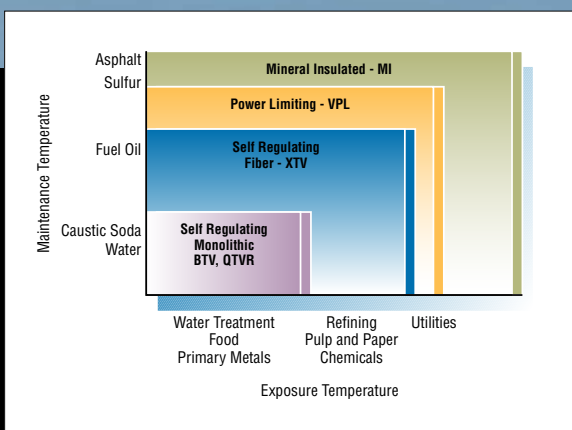
**Uniform temperatures** Because the heater senses and responds to actual conditions along the pipe, the system automatically accommodates variations due to static fluid and differing elevations.

**Unconditional T-ratings** Our self-regulating heating cables offer unconditional T-ratings, as specified by the National Electrical Code, article 500-8 (B).



## POWER-LIMITING TECHNOLOGY

- The power-limiting VPL heater is based on a coiled resistor alloy-heating element wrapped around two parallel bus wires. The resistance of this heating element increases as its temperature increases, creating a positive temperature coefficient (PTC) effect.
- The PTC effect results in a decrease in power output at elevated temperatures. This allows the VPL to cross over itself without damage from overheating.



*Choose the right technology for your heat-tracing application. Tyco Thermal Controls offers the greatest selection in self-regulating, power-limiting and mineral insulated heating cables.*

**Raychem®**

# Advanced Heat-Tracing Control and Monitoring Systems

## Multipoint Control and Monitoring Systems

DigiTrace multipoint control and monitoring systems provide scalable solutions for both hazardous and nonhazardous locations. The systems sense pipe or tank temperatures to provide tight control in process temperature maintenance or critical freeze protection applications. They also feature continuous monitoring technology to detect heat-tracing faults, monitor heat-tracing current and provide networking capabilities.

**DigiTrace NGC-30** This microprocessor-based controller represents Tyco Thermal Controls next generation controllers. The User Interface Terminal (UIT) utilizes touch screen technology to simplify programming, monitoring and fault identification. The NGC-30 systems with the UIT are approved for use in both hazardous and nonhazardous locations. This system can support up to 260 heat-tracing circuits and is compatible with the RMM2 temperature monitoring module. Each heat-tracing circuit can be independently programmed to provide maximum system flexibility.

### Features:

- Control and monitoring with high/low current and temperature alarms
- Meets NEC requirements for ground-fault trip protection
- Up to 60-Amp solid-state relays or mechanical contactors
- Communication with host system over Ethernet or an RS-485 twisted pair
- RTD failure alarm
- Can be located in Hazardous Class I Div 2 hazardous locations

**DigiTrace T2000** This microprocessor-based controller uses a single control card per heat-tracing cable architecture to maximize system reliability. The singlepoint T2000 control modules are easily inserted into a rack assembly as circuits are added. Individual circuits may be locked out or changed without affecting other circuits. Optional hand-held programmer available for both hazardous and nonhazardous locations allows for local digital communications.

## Single- and Dual-Point Control and Monitoring Systems

**DigiTrace 910 and 920** Both the 910 (single-point controller) and the 920 (dual-point controller) provide the same features as the T2000 multi-circuit controllers. These controllers are designed for use when just a few lines of heat-tracing are required. Both controllers are available for hazardous and nonhazardous locations, and are fully compatible with the DigiTrace Supervisor software.

**DigiTrace JBS-100-ECP-A and JBS-100-ECW-A** These electronic temperature controllers provide accurate control of a single heating circuit using a RTD sensor. The JBS-100-ECP-A is pipe-mounted and serves as a power connection kit for both Raychem self-regulating and Pyrotenax mineral insulated heating cables. The JBS-100-ECW-A is wall-mounted, and may be used with all types of heating cables. Both the JBS-100-ECP-A and JBS-100-ECW-A have adjustable set points between 32°F to 425°F (0°C to 218°C), power input of 120 Vac to 277 Vac and switches current up to 30 A.

A local display allows for monitoring of set point, actual temperature and also indicates alarm conditions. These units are c-USA-us (certified to U.S. and Canadian Standards) for use in nonhazardous locations.



NGC-30



CRM/CRMS



Remote Mount UIT



Portable programmer



CM2000+



T2000



910 series



920 series



JBS-100-ECP-A



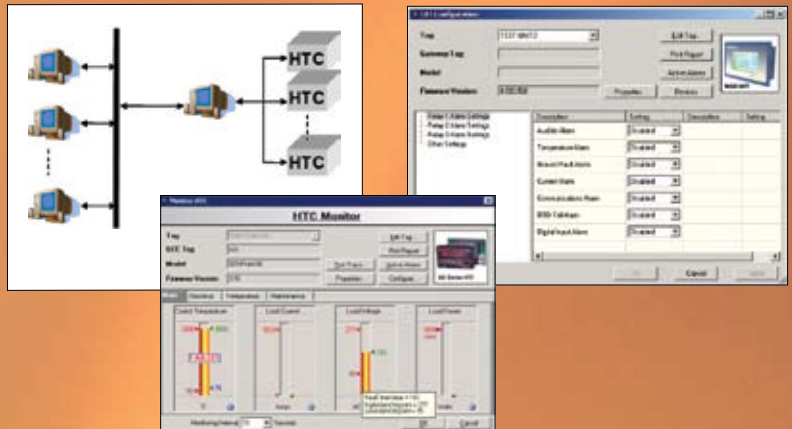
JBS-100-ECW-A



## Additional Heat-Tracing Controls and Heat-Trace Panels

### Supervisor Software

The **DigiTrace** Supervisor software enables users to interface with field installed DigiTrace NGC-30, 910, 920 and T2000 control Systems. The Windows®-based Supervisor software can be used to program individual units or groups of units, monitor, check, and record alarm status, data log, and generate reports.



### Remote Temperature Monitoring

**DigiTrace** Control and Monitoring Systems are supported by remote temperature monitoring devices. These devices are designed to help reduce costs by eliminating home runs for RTDs. The devices are available for hazardous and nonhazardous locations.



RMM2



SES

### Thermostats and RTDs

**DigiTrace** simple ambient and line sensing mechanical or electronic thermostats are for use in nonhazardous and hazardous locations.

Also choose RTDs for nonhazardous and hazardous locations as well as low and high temperature applications.



E507S-LS

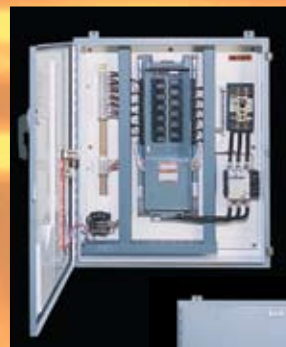


RTD4AL

### Heat-Trace Panels

**DigiTrace** dedicated power-distribution panels can reduce costly field wiring and reduce controller costs. Choose from a complete line of dedicated heat-tracing power distribution panels. Each is available with:

- Group or individual circuit control
- Standard circuit breakers, ground-fault breakers, or ground-fault breakers with alarm



HTPG



HTPI



## Engineered Products

*Tyco Thermal Controls offers a wide array of engineered products for the industrial market. Each product is designed to add value to even the simplest of heat-tracing installations.*

### Steam-Tracing Systems

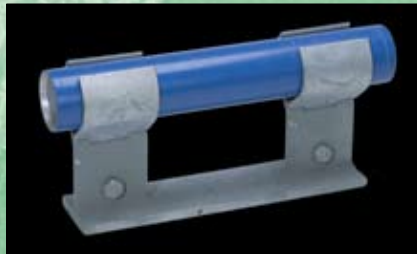
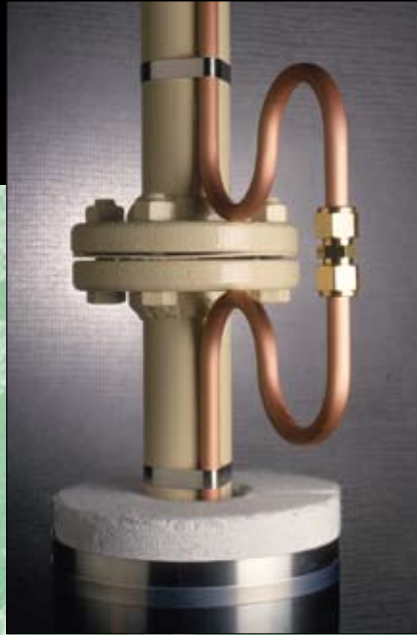
Providing complete steam-tracing and recirculating fluid-tracing systems, **Tyco Thermal Controls Services** include not only installation, but also isometric detail drawings with heat-tracing parameters and calculations, typical and project specific installation details, nameplate and tagging schedules, complete system Bill of Material generation, and post-construction “as-built” documentation. These, along with established project management techniques, ensure your steam-heating system performs as required.

### Pipe Shoes

The **Interlock™** clamp-on pipe shoe is a patented pipe support design that eliminates field welding requirements for pipe supports, which is a significant benefit in heat-tracing design and construction. It can be used on all pipe applications, including bare pipe, painted pipe, insulated pipe, and heat-traced pipe.

### Pre-traced Pre-Insulated Safety Stations

**ShowerGuard™** pre-traced, pre-insulated safety shower/eyewash unit is designed to minimize field installation requirements and eliminate the numerous disadvantages associated with field installations of electric heat-trace cable, insulation, and moisture-barrier jacketing.



**TRACER®**



## Pre-Fabricated EHT Buildings

Systems containing a large number of heat-tracing circuits contained within a small amount of real estate may benefit from the use of a **Pre-Fabricated EHT building**. These buildings provide a common location for heat-trace controllers and power distribution. They may also include dedicated heat-trace transformers and dedicated control and monitoring software, as well as provide a well-organized, comfortable area in which to service your heat-tracing system. Additional benefits include reduced power distribution and control wiring as well as greatly reduced field construction cost and scheduling concerns.



## Tank Insulation Systems

**Trac-Loc™** standing lock seam insulation system delivers structurally superior, maintenance-free, and lower-cost insulation than conventional tank insulation methods.



**TRACER®**  
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## Web Services and Software

### Visit [www.tycothermal.com](http://www.tycothermal.com)

All the tools and information you need to design, select, and purchase a complete heat-tracing system. Use our Web-based program, or download design software to use off-line. Download, print, or browse product data sheets and installation instructions.



### Download Design Software

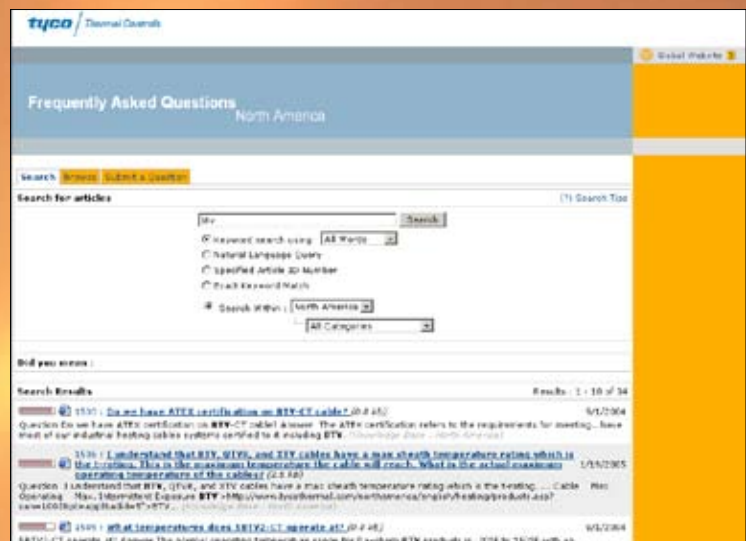
Save time with TraceCalc® Pro. This software provides complete heat-tracing designs for pipes, tanks and vessels in a fraction of the time needed for manual design.



### On-Line Technical Support

On our interactive frequently asked questions and answers (FAQ) page, you'll find questions broken down by markets and product lines.

If your question does not appear, simply submit a new question. A Tyco Thermal Controls technical expert will answer your question and post it to the Web site.



### Design On-Line

TraceCalc Net is an on-line tool that walks you through heat trace design in three simple steps:

- Finding the right products for your application
- Choosing quantities for a complete bill of materials
- Selecting optional control and monitoring systems





***We manage the heat you need™***



## **Before you buy, weigh the facts:**

**The leading full-service integrator** Nobody puts the entire system together better. By optimizing Heat-Tracing, Insulation and Power Distribution requirements with an unbiased selection of technologies, our turnkey services will bring your project predictable, reliable results.

**Greater selection** Offering the most complete product line of proven heat-tracing technologies to better satisfy your unique needs.

**More innovation** As a world leader in heating cable technologies, heat-tracing design optimization, construction, and control and monitoring systems we invented many of today's industry standards.

**More manufacturing experience** Quality-driven manufacturing processes, combined with years of manufacturing self-regulating and mineral-insulated cables gives you products proven to be the most reliable.

**The most advanced line of control and monitoring systems** From single circuit mechanical thermostats to multi-circuit, microprocessor-based networked systems, we can meet all of your control and monitoring requirements, allowing your system to run safely, reliably and profitably.

***For Proven Heat-Tracing Solutions, Look to the Leader.***



**NORTH AMERICAN OPERATIONS**



- ★ Service Centers
- ★ Manufacturing Centers

**SALES OR TECHNICAL SUPPORT**

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**Raychem®**



**TRACER®**

**DigiTrace®**



**isopad™**

**TraceTek®**

The logo features the word "tyco" in a bold, lowercase, sans-serif font. The "y" is stylized with a horizontal bar that extends to the left and underlines the word.

Thermal Controls



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