

# HEATING CABLE SELECTION GUIDE



# Pipe Tracing

For freeze protection and process heating applications up to 400°F.

# Heating Cable Selection Guide

---

## *PURPOSE*

Pipe Tracing (a.k.a heat tracing) is commonly used to ensure that process, fluid, or material temperatures within pipes and piping systems are *maintained* above ambient temperatures during static flow conditions.

Under certain conditions, pipe tracing systems may also be designed to increase (heat up) process, fluid, or material temperatures within pipes and piping systems.

This guide provides information and data for the correct selection a particular type or style of heating cable to meet the specific requirements of conventional temperature maintenance applications only. For heating cable selection information relating to heat raise applications, please contact HTD .

---

## *INDUSTRY STANDARDS AND PUBLICATIONS*

Pipe and Heat Tracing design considerations, heat loss calculations, installation and maintenance requirements are extensively covered by IEEE Standard 515-1997. Additional information and requirements are also published in NFPA National Electrical Code under Article 427.

The material used in this selection guide is consistent with the information, requirements and recommendations of both of these industry standards and publications.

---

## *PRODUCTS*

The information contained within this Heating Cable Selection Guide is intended for use with Therma-Linx, WinterSafe, WinterSafe Plus, AutoWatt Xtra, PermaWatt and VersaTrace heating cables as manufactured by HTD Heat Trace, Inc. Whitehouse, New Jersey.

## SELECTION PROCEDURE

### STEP 1

Use the maximum temperature that the process is expected to reach (MPT) to determine the Maximum Intermittent Temperature ( $T_e$ ) that the heating cable will be exposed to. When applicable, steam cleaning temperatures must be considered part of the maximum expected process temperature (MPT)

*Select only the cables with a  $T_e$  value greater than your MPT*

---

### STEP 2

Identify the desired Fluid Maintain Temperature ( $T_m$ ).

*Select only cables with a Maximum Maintenance Temperature greater than your  $T_m$*

---

### STEP 3

Identify the Minimum Expected Ambient Temperature ( $T_a$ ).

*Select only cables with a Minimum Temperature Exposure value that is lower than your  $T_a$*

---

### STEP 4 (see Note 1a)

Determine the required watts per foot of pipe that must be installed on the pipe to offset the heat loss figure calculated using Steps 1 through 5 of the Thermal Design Guide.

*Select only cables with a watts/ft output that is greater than the calculated rate of heat loss*

---

### STEP 5

Identify the operating voltage for the heating system.

*Select only cables that can operate on the available voltage*

---

### STEP 6A

Determine the total allowance of cable to be installed on the pipe.

*Length of pipe (ft) plus 5 to 10%*

---

### STEP 6B

Determine the total allowance of cable to be installed on each valve within the system.

*Divide the value (watts) determined in Step 6 of the Thermal Design Guide by the watts/ft rating of the cable selected in Step 4 (above) to determine the length of cable (ft) required to trace each valve. Multiply this length (ft) by the total number of valves involved.*

---

### STEP 6C

Determine the total allowance of cable to be installed on each pipe support within the system.

*Divide the value (watts) determined in Step 7 of the Thermal Design Guide by the watts/ft rating of the cable selected in Step 4 (above) to determine the length of cable (ft) required to trace each pipe support. Multiply this length (ft) by the total number of supports involved.*

#### STEP 7

Determine the total length of cable to be installed.

*Add all of the cable lengths determined in 6A, 6B and 6C together.*

---

#### STEP 8 (see Notes 2a, 2b and 2c)

Consider the heating circuit requirements

*Whenever possible, select only the cable that offers a Maximum Circuit Length that is greater than the value (ft) determined in STEP 7 above.*

---

#### STEP 9 (see Note 3a)

Consider the process and environmental design features unique to the application and area of installation.

*Select only the cable that offers resistance to the fluid within the pipe and the chemicals / atmospheres for the environment surrounding the installation.  
Select cables with an overbraid or overbraid and over jacket for piping systems that require frequent maintenance.*

---

#### STEP 10

Consider the classification for the area of installation

*Select only the cables that offer approved ratings and classifications that meet or exceed the specific requirements of your application and/or installation.*

---

## NOTES

#### NOTE 1a

When selecting a self-regulating heating cable, use the appropriate Power Output Graph for the cable being considered to determine the watts per foot available at the Maintenance Temperature (T<sub>m</sub>) for your application.

#### NOTE 2a

When a single length of cable determined in STEP 7 exceeds the Maximum Circuit Length of the cable being considered, divide the single length into two (or more) runs and design multiple (shorter) circuits.

#### NOTE 2b

Refer to the data sheet specific to each cable to evaluate the maximum lengths of cable that can be installed on standard size circuit breakers.

#### NOTE 2c

HTD and the 2002 National Electric Code, Sections 426 and 427 require the use of ground fault equipment protection. Square D type QO-EPD and QOB-EPD circuit breakers with 30mA trip levels are recommended.

#### NOTE 3a

The 2002 National Electric Code, Article 427-23A requires that all heating cables, after July 1, 1996 must be supplied with a grounded metal covering. To comply with this requirement, all US customers must select, as a minimum, the overbraided version of each style of heating cable discussed in this Heating Cable Selection Guide and the following Heating Cable Selection Matrix.



HTD Heat Trace, Incorporated  
8 Bartles Corner Road  
Unit #104, Flemington, NJ  
USA 08822-5758

sales@htdheattrace.com  
Voice - +1.908.788.5210  
Fax - +1.908.788.5204  
www.htdheattrace.com