

# Flexible Heaters

## Adhesive Backed Heating Tape



### Electrical Resistance Heating Tape — Adhesive Backed

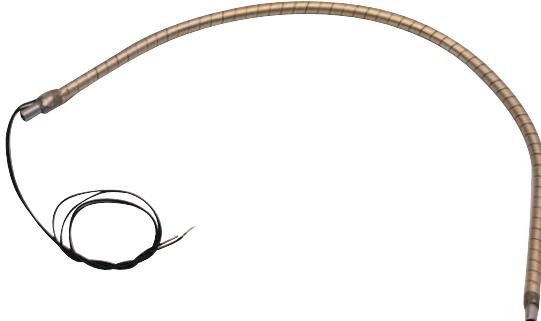
#### Designed For High Heat Transfer

All electrical resistance elements create heat, but some systems are better at transferring this energy. The secret to this heating tape is in its thermally conductive adhesive and its outer reflective sheath.

The adhesive surrounds the resistance wire and transfers the thermal energy directly to the surface of the load. The resistance wire itself has a back and forth kink that acts as a spring to absorb expansion and contraction.

The outer aluminum sheath spreads heat evenly over the entire surface of the tape and also reflects heat back onto the load.

The end result is a highly efficient heating source with maximum heat being transferred to the desired material.



Typical finished assembly with leads.



#### ADHESIVE SPECIFICATIONS

	Silicone	Acrylic
Operating Temperature Range	-100°C to 250°C -148°F to 482°F	-40°C to 150°C -40°F to 302°F
Outgassing... TML/VCM	1.047%/.322%	1.0%/.10%
Adhesion to Etched Aluminum (oz/inch width)	28 @ +125°C 450 @ -100°C	15 @ +125°C 50 @ -100°C
Overall Thickness Applied	.025" (.63 mm)	.028" (.71 mm)
Dielectric Strength	600 Vdc	600 Vdc

#### Typical Applications

- Cylinder wrap ideal for tubes, pipes or vessels.
- Placed directly on PVC, PTFE plastic pipe without the need for other material.
- Excellent for prototype engineering, placing heat exactly where it is needed.
- Even heating throughout the length of a heated hose for hot wax handling, food processing, hot melt and other plastic processing.
- De-fogging, de-icing, fuel line warming.
- Acrylic product approved by NASA for space flight.
- Acrylic low outgassing perfect for vacuum applications.

#### Product Types

**4 Conductor Tape** 1/2" (12.7 mm) wide; has the highest watt density and the most variety of resistances. It can have leads at one end in the case of a series connection or a series/parallel connection, or leads at either end in a parallel connection.

The tightest wrap this tape can achieve is on a 1/4" (6.3 mm) O.D. surface. A smaller tube should be wrapped with 1/4" (6.3 mm) or 1/6" (4.2 mm) tape.

**2 Conductor Tape** 1/4" (6.3 mm) wide; has leads on one end in the series connection, and leads at both ends for parallel connections. This tape will wrap down to 1/8" (3.17 mm) O.D.

**1 Conductor Tape** 1/6" (4.2 mm) wide; can wrap down to .060" (1.52 mm) O.D. A lead will be present at both ends.

#### General Purpose Wattage Calculations for Tube and Pipe Heating

$$Tp = P \times L \times \Delta T$$

**Tp** = Total Watts Required

**P** = Watts per lineal foot of tube per °F temp. rise (see chart below)

**L** = Length of tube in feet

**ΔT** = Temperature rise, °F above ambient

**To Find P:** Look at the intersection of Tube O.D. and Insulation thickness.

Insulation Thickness	Tube Outside Diameter			
	1/4"	1/2"	1"	2"
Bare	.10	.13	.21	.40
1/2"	.07	.09	.13	.20
1"	—	.05	.08	.11

**Note:** This is for estimating power requirements only. Confirmation by prototype testing is recommended.

- If the temperature rise is over 100 degrees, increase the wattage by 10%.
- For rapid start-up and to allow for colder material entering the hose, increase the wattage by 25% and use a temperature controller with a temperature sensor.

**Warning !!** FTP Heat Tape is essentially resistance wire in a mountable high temperature adhesive backed tape. In order to be used properly, the heater design must be done and the math worked out, following the example provided.

**View Product Inventory @ [www.tempco.com](http://www.tempco.com)**

### Electrical Resistance Heating Tape — Adhesive Backed

#### Engineering Example

A 10 ft. stainless steel braided hose, 1/2" O.D., needs to be heated to 400°F from 70°F. Insulation: 1/2". The voltage is 220V.

##### 1. Determine the Length.

To cover the hose completely would take  $\pi \times 1/2" \times 120" = 188$  sq. in. A 12" length of 1/2" tape would cover 6 sq. in. of hose; therefore, 31 ft. of 1/2" tape would completely cover the hose, spiral wrapped edge to edge.

##### 2. Determine the Watts.

Total Power ( $T_p$ ) =  $P \times L \times \Delta T$   
From the chart,  $P = .09$  for a 1/2" hose with 1/2" insulation, therefore  
 $T_p = .09 \times 10 \text{ ft.} \times (400-70) = 297$  Watts. For rapid start-up and to compensate for colder material flowing through the hose, increase the wattage by 25% to 400W.

##### 3. Calculate the Ohms per Foot.

The ohms/ft. =  $E^2 \div (T_p \times L)$   
Therefore ohms/ft. =  $220^2 \div (400W \times 31 \text{ ft.}) = 3.9$  ohms per ft.

##### 4. Calculate the Watts per Foot.

The Watts per ft. =  $T_p \div L$   
Therefore the watts/ft. = 400 watts ÷ 31 ft. = 12.9 watts/ft.

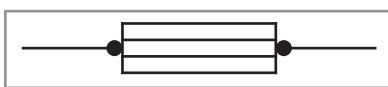
##### 5. Choose Heat Tape Material from the Table.

From the table, the FTP00035, 1/2" tape with four conductors and silicone adhesive in the parallel/series connection at 4.0 ohm/ft. would fill the requirements. The required 12.9 watts/ft. is well under the maximum rating of 62 watts/ft.

#### CHART NOTES

##### Resistance Wiring

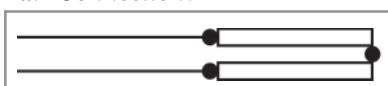
**Type 1.** Ohms per foot, with all conductors in a *Parallel Connection*.



**Type 2.** Ohms per foot, with all conductors in a *Series Connection*.



**Type 3.** Ohms per foot, with all conductors in a *Parallel - Series Pair Connection*.



#### Max. Watts/ft. in Ohms-Per-Foot Table

The maximum wattage per lineal foot is when the heat tape is applied to a metal heat sink at room temperature. Reduce these ratings linearly to zero watts output at 500°F. Adhesion to heat sink along entire length is important to prevent burnout when tape is used near maximum wattage rating.

**Example:** A tape that is 70W/ft. maximum watt density at 74°F, would derate to about 35W/ft. maximum watt density at 250°F.

#### Ordering Information — Bulk Heat Tape

Heat Tape can be ordered in **bulk in 50 or 100 ft. rolls** or in custom assemblies. The part number for each item is completed by filling in the  with a number from the following table to detail adhesive type and tape width:

**1**—silicone, 1/6" wide (1 cond.)  
**4**—acrylic, 1/4" wide (2 cond.)

**2**—acrylic, 1/6" wide (1 cond.)  
**5**—silicone, 1/2" wide (4 cond.)

**3**—silicone, 1/4" wide (2 cond.)  
**6**—acrylic, 1/2" wide (4 cond.)

#### Custom Engineered/Manufactured Heaters

For a quote, **Please Specify** the following

Application Information  Wattage Requirements  Lead Information:

 **WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**(800) 323-6859 • Email: [sales@tempco.com](mailto:sales@tempco.com)**



Bulk roll of Heat Tape

#### Heating Tape — Ohms-Per-Foot Table

Width	1/6" (4.2 mm)		1/4" (6.3 mm)		1/2" (12.7 mm)						
	Number of Conductors	1 conductor	2 conductors	4 conductors	1 conductor	2 conductors	4 conductors				
Part Number		Max. Ohms/ft. see notes (1)	Max. Watts/ft. (1)	Max. Watts/ft. (2)							
FTP0001	FTP1001	1.9	25	.9	3.8	40	.5	1.9	7.6	70	
FTP0002	FTP1002	3.2	25	1.6	6.4	40	.8	3.2	12.8	70	
FTP0003	FTP1003	4.0	23	2.0	8.0	35	1.0	4.0	16.0	62	
FTP0004	FTP1004	4.9	20	2.4	9.8	30	1.2	4.9	19.6	52	
FTP0005	FTP1005	7.0	25	3.5	14.0	40	1.7	7.0	28.0	70	
FTP0006	FTP1006	8.8	23	4.4	17.6	35	2.2	8.8	35.2	62	
FTP0007	FTP1007	10.8	20	5.4	21.6	30	2.7	10.8	43.2	52	
FTP0008	FTP1008	13.2	20	6.6	26.4	30	3.3	13.2	52.8	52	
FTP0009	FTP1009	21.3	13	10.6	42.6	20	5.3	21.3	85.2	32	
FTP0010	FTP1010	26.8	10	13.4	53.6	16	6.7	26.8	107.2	25	

#### Accessories

*Terminal Kit for 1-wire	16-20 Ga.	22-26 Ga.
2-wire	FTP00911	FTP00913
Additional solderless crimps	FTP00912	FTP00914
Aluminum/Silicone	FTP00920	FTP00921
Heat Transfer Tape	3/4" × 27 ft.	1-1/4" × 27 ft.
	FTP00930	FTP00931

\*Terminal Kits  
Have been discontinued.

**Terminal kits** have been discontinued.

The “solderless crimps” are used to complete the non-lead end of the heater.

The **Heat Transfer Tape** is used to provide additional adhesion, placed over the heating tape.