

TSR Self-Regulating Pipe Tracing Heating Cable Specification/Application Guide



READ CAREFULLY

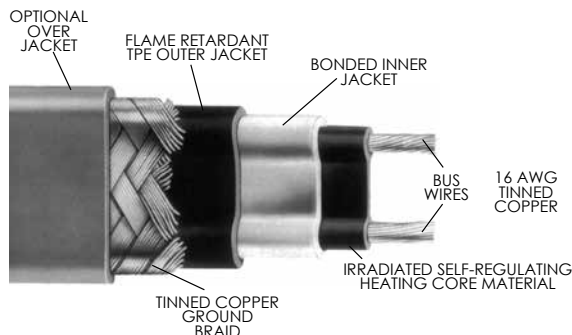
PRINCIPLE OF OPERATION

Easy Heat TSR is a self-regulating heating cable that automatically varies its heat output with changes in surrounding temperature. Since this cable regulates its heat output with temperature, a thermostat may not be necessary for some applications.

Easy Heat TSR cable can be used for pipe freeze protection or temperature maintenance applications, in either ordinary or hazardous (CID2) locations. TSR cable is available with fluoropolymer overjacket (-F) for use in areas requiring enhanced chemical resistance. TSR cable with fluoropolymer overjacket is suitable for maintaining grease and fuel lines at temperatures required for flow conditions.

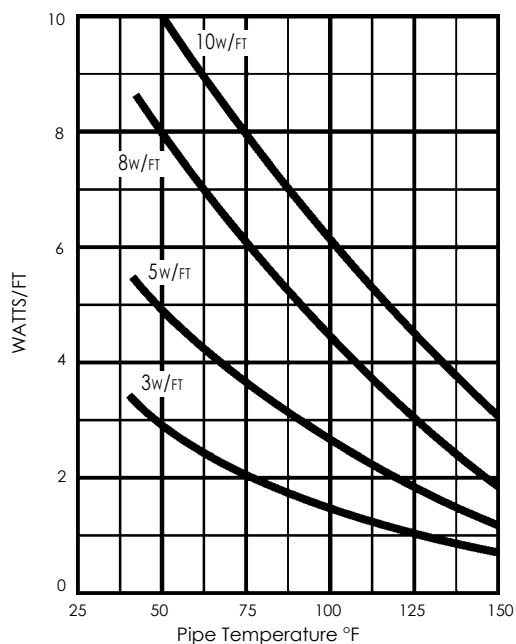
The TSR cable is available with power densities of 3, 5, 8 and 10 Watts per foot. This power is specified at a surrounding temperature of 50°F. At other temperatures, of course, the cable power output will be considerably different. (See chart). Because of the self-regulating feature of this cable, it can be

CONSTRUCTION DETAILS



wrapped over itself (overlapped), if necessary, when installed on pipes, valves or flanges.

Nominal Power Output on Metal Pipe



Voltage Adjustment Table

Cable	Power Rating Multiplier		
	208 VAC	220 VAC	277 VAC
TSR32	0.85	0.91	1.13
TSR52	0.87	0.92	1.09
TSR82	0.88	0.93	1.08
TSR102	0.89	0.94	1.05

Note:

- Maximum maintenance temperature of all cables is 150°F (66°C) with 185°F (85°C) maximum intermittent exposure temperatures.
- For applications in hazardous (classified) locations, all cables have a T5 surface temperature identification number.

TSR SPECIFICATIONS/APPLICATION INFORMATION

Performance and Rating Data

Catalog Number	Service Voltage	Power Rating Watts/ft @ 50°F (10°C)	Maximum Single Run Length	Over Jacket Material
TSR31J	120	3	325' (99m)	Polyolefin
TSR31-F				Fluoropolymer
TSR32J	240	3	650' (198M)*	Polyolefin
TSR32-F				Fluoropolymer
TSR51J	120	5	270' (82M)	Polyolefin
TSR51-F				Fluoropolymer
TSR52J	240	5	540' (165M)*	Polyolefin
TSR52-F				Fluoropolymer
TSR81J	120	8	210' (64M)	Polyolefin
TSR81-F				Fluoropolymer
TSR82J	240	8	420' (128M)*	Polyolefin
TSR82-F				Fluoropolymer
TSR101J	120	10	180' (55M)	Polyolefin
TSR101-F				Fluoropolymer
TSR102J	240	10	360' (110M)*	Polyolefin
TSR102-F				Fluoropolymer

Note: All above cables are also available with fluoropolymer over jacket (for enhanced chemical resistance, change suffix J to -F). *Lengths good for 208 & 277 VAC.

Voltage	Cable Power Watts/FT	Start-up Temp	Maximum Total Cable Length vs. Circuit Breaker Rating			
			15A	20A	30A	40A
120	3	-20°F (-29°C)	205' (63M)	275' (84M)	415' (127M)	555' (169M)
		0°F (-18°C)	230' (70M)	305' (93M)	460' (140M)	615' (188M)
		50°F (10°C)	325' (99M)	435' (133M)	655' (200M)	875' (267M)
	5	-20°F (-29°C)	135' (41M)	180' (55M)	270' (82M)	360' (110M)
		0°F (-18°C)	155' (47M)	205' (72M)	310' (94M)	410' (144M)
		50°F (10°C)	225' (69M)	270' (82M)	450' (138M)	540' (164M)
	8	-20°F (-29°C)	90' (27M)	115' (35M)	175' (53M)	230' (70M)
		0°F (-18°C)	100' (30M)	130' (40M)	195' (59M)	260' (80M)
		50°F (10°C)	145' (44M)	195' (59M)	290' (88M)	390' (118M)
	10	-20°F (-29°C)	75' (23M)	100' (30M)	145' (44M)	200' (60M)
		0°F (-18°C)	85' (26M)	110' (34M)	155' (47M)	220' (68M)
		50°F (10°C)	115' (35M)	150' (46M)	230' (70M)	300' (92M)
240	3	-20°F (-29°C)	410' (125M)	545' (166M)	820' (250M)	1095' (334M)
		0°F (-18°C)	460' (140M)	615' (188M)	925' (282M)	1235' (377M)
		50°F (10°C)	650' (198M)	865' (264M)	1300' (396M)	1725' (529M)
	5	-20°F (-29°C)	275' (84M)	379' (113M)	540' (165M)	758' (226M)
		0°F (-18°C)	310' (94M)	415' (127M)	620' (189M)	830' (254M)
		50°F (10°C)	460' (140M)	540' (165M)	920' (280M)	1080' (330M)
	8	-20°F (-29°C)	175' (53M)	235' (72M)	350' (107M)	420' (128M)
		0°F (-18°C)	200' (61M)	265' (81M)	395' (120M)	420' (128M)
		50°F (10°C)	295' (90M)	390' (119M)	590' (180M)	780' (238M)
	10	-20°F (-29°C)	150' (46M)	195' (59M)	290' (83M)	390' (118M)
		0°F (-18°C)	165' (50M)	220' (67M)	325' (99M)	440' (134M)
		50°F (10°C)	230' (70M)	305' (93M)	460' (140M)	610' (186M)

The use of ground fault protection equipment for heating cable applications is required by NEC and CSA CEC.

Connection Kits

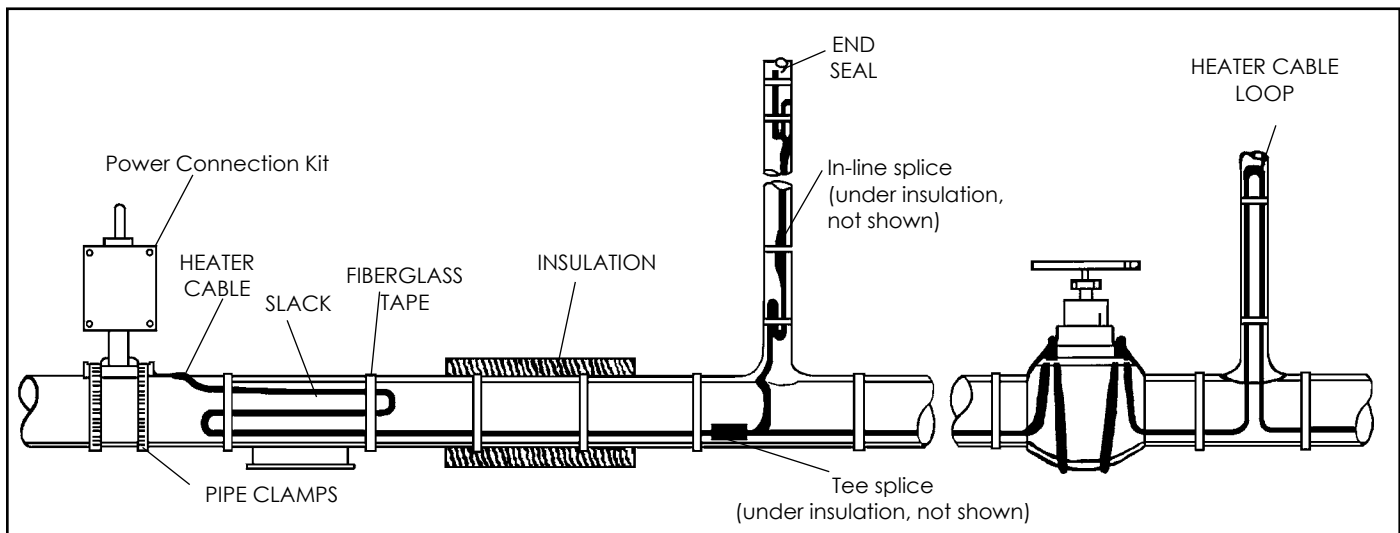
- TSRP – Power
- TSRS – Splice
- TSRT – Tee
- TSRL – Pilot Lights
- SRME – Silicone End Termination
- SRMP – Silicone Power End Connection

Controls

- T9EC – Line sensing adjustable
- T9EA – Ambient sensing adjustable
- T4XC – Line sensing adjustable Nema4X.
- T4XA – Ambient sensing adjustable Nema 4X.

TSR Cable with polyolefin overjacket (suffix 'J') may also use SR Trace Kits in nonhazardous applications.

TYPICAL INSTALLATION



PLEASE NOTE THAT THIS INSTALLATION IS FOR ORDINARY (NON-HAZARDOUS) LOCATIONS

DESIGN PROCEDURE

The following procedure can be used to select a heating cable system for your application. However, Easy Heat can also provide design assistance and will recommend appropriate cable, controls and accessories. Call Easy Heat for further information. To determine the heat loss that must be replaced by the heating cable, the following should be determined:

- T_f Fluid temperature to be maintained
- T_A Minimum ambient temperature
- Size and material of pipe to be heated
- Thermal insulation – type and thickness
- Pipe supports and valves, etc.

1. TEMPERATURE DIFFERENTIAL

Determine the temperature differential (DT) to be maintained by subtracting the ambient temperature (T_A) from the fluid temperature (T_F) to be maintained ($DT=T_F-T_A$). Typically, for pipe freeze protection applications, the pipe temperature should be maintained at 40°F. Pipe temperatures should be maintained at 110°F for grease disposal lines and 40°F for fuel lines.

2. HEAT LOSS

Use Table 1 to look up the heat loss associated with the pipe diameter and thickness of insulation. If a rigid insulation such as calcium silicate is used, the pipe heat loss should be increased to that associated with the next larger size. Insulation should also be oversized when using any cable other than the standard self-regulating TSR, without overjacket. This will compensate for the space of the heating cable. As an example, you would use 2-inch pipe diameter heat losses for 1 1/2 inch pipe heating application if rigid insulation were used. Heat loss figures from Table 1 include a 10% safety factor.

3. ADJUSTMENTS TO HEAT LOSS VALUES

The heat losses in **Table 1** are based on glass fiber insulation. If other insulations are used, multiply the heat loss value by the correction factor (shown in **Table 2**) for your insulation.

Heat losses are based on outdoor applications with 20 mph wind. If piping is used indoors, multiply heat loss values by 0.9.

4. DETERMINE CABLE POWER

Using heat loss determined above, select appropriate cable from Performance and Rating Data chart. For heat loss in excess of 10 W/ft, use multiple cables. For example, for heat loss of 13 W/ft, use two 8 W/ft cables. Cable power may exceed heat loss by up to 50%.

It is also possible to spiral cable on pipe such that the power applied to the pipe exactly matches the pipe heat loss. For example, for heat loss of 13 W/ft, a 10 W/ft cable can be spiraled on the pipe such that 1.3 feet of cable are wound on every foot of pipe, resulting in exactly 13 W/ft being applied to the pipe.

However, spiraling requires significant extra labor to install and significant clearance around the pipe. For this reason, we do not recommend spiraling. For further information on spiraling, contact Easy Heat.

Table 1 – Pipe Heat Loss, W/FT

Insulation Thickness	ΔT (°F)	IPS Tubing	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	8	10	12
			3/4	1	1 1/4	1 1/2	2								
1.0" (25mm)	10		0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.5	1.9	2.4	2.7
	50		1.7	1.9	2.2	2.5	2.8	3.3	3.8	4.4	5.4	7.5	9.5	11.5	13.5
	100		3.5	3.9	4.5	5.3	5.8	6.8	7.9	9.2	11.3	15.7	19.8	24.5	28.2
	150		5.4	6.2	7.1	8.3	9.1	10.7	12.4	14.4	17.5	24.6	31.0	37.8	44.2
	200		7.5	8.6	9.9	11.5	12.6	14.9	17.2	20.0	24.5	34.2	43.2	52.6	61.5
	250		9.8	11.2	12.8	15.0	16.5	19.4	22.4	26.0	31.9	44.6	56.1	68.4	80.0
1.5" (38mm)	10		0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.8	1.1	1.4	1.6	1.9
	50		1.3	1.5	1.7	1.9	2.1	2.5	2.8	3.2	3.9	5.3	6.7	8.1	9.4
	100		2.8	3.1	3.5	4.1	4.4	5.1	5.9	6.8	8.2	11.2	14.0	16.9	19.7
	150		4.4	4.9	5.5	6.4	6.9	8.1	9.2	10.6	12.8	17.6	21.9	26.5	30.8
	200		6.1	6.8	7.7	8.9	9.7	11.2	12.8	14.7	17.8	24.4	30.5	36.9	42.9
	250		7.9	8.9	10.0	11.6	12.6	14.6	16.7	19.2	23.2	31.8	39.6	48.0	55.8
2.0" (50mm)	10		0.2	0.3	0.3	0.4	0.4	0.4	0.65	0.5	0.6	0.9	1.1	1.3	1.5
	50		1.2	1.3	1.4	1.6	1.7	2.0	2.3	2.6	3.1	4.2	5.2	6.3	7.3
	100		2.4	2.7	3.0	3.4	3.7	4.3	4.8	5.5	6.6	8.9	11.0	13.2	15.3
	150		5.4	6.2	7.1	8.3	9.1	10.7	12.4	14.4	17.5	24.6	31.0	37.8	44.2
	200		5.3	5.9	6.6	7.5	8.1	9.3	10.5	12.0	14.4	19.4	24.0	28.8	33.4
	250		6.9	7.7	8.6	9.8	10.67	12.1	13.7	15.6	18.7	25.3	31.2	37.5	43.5
2.5" (63mm)	10		0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.7	0.9	1.1	1.2
	50		1.0	1.2	1.3	1.4	1.6	1.8	2.0	2.3	2.7	3.6	4.4	5.2	6.0
	100		2.2	2.4	2.7	3.0	3.3	3.7	4.2	4.7	5.6	7.5	9.2	11.0	12.7
	150		3.4	3.8	4.2	4.8	5.1	5.8	6.6	7.4	8.8	11.7	14.4	17.2	19.9
	200		4.8	5.3	5.9	6.6	7.1	9.1	9.1	10.3	12.3	16.3	20.0	24.0	27.6
	250		6.2	6.9	7.6	8.6	9.3	10.6	11.9	13.5	16.0	21.3	26.1	31.2	36.0
3.0" (75mm)	10		0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.8	0.9	1.1
	50		1.0	1.1	1.2	1.3	1.4	1.6	1.8	2.0	2.4	3.1	3.8	4.5	5.2
	100		2.0	2.2	2.5	2.8	3.0	3.4	3.7	4.2	5.0	6.5	8.0	9.5	10.9
	150		3.2	3.5	3.9	4.3	4.6	5.3	5.9	6.6	7.8	10.3	12.5	14.9	17.1
	200		4.4	4.9	5.4	6.0	6.5	6.7	8.2	9.2	10.8	14.3	17.4	20.7	23.8
	250		5.8	6.3	7.0	7.8	8.4	9.5	10.6	12.0	14.1	18.6	22.6	26.9	30.9

Contact Easy Heat for larger sizes.

Table 2 – Insulation Factors

Insulation Type	Correction Factor
Glass Fiber	1.00
Calcium Silicate	1.72
Cellular Glass	1.84
Rigid Urethane	0.76
Foamed Elastomer	1.16
Mineral Fiber	1.20
Expanded Perlite	1.42
Mineral Wool	1.04
Polystyrene	1.04
Flexible Elastomer	1.16
Polyisocyanurate	0.68

5. ADJUSTMENTS FOR HEAT SINKS

Any thermally conductive item that protrudes through the insulation will require extra heat to be applied to the pipe. The footage shown in **Table 3** should be added to the required heater cable length to compensate for these extra heat losses. When multiple-tracing or spiraling cable, increase the cable adds proportionately.

Table 3 – Heat Loss Adder

Pipe Size	Additional Heater Feet for Various Heat Sinks		
	Flange	Pipe Support (1)	Valve
.50	.5	1.0	1.0
.75	.5	1.5	1.5
1.00	.5	1.5	2.0
1.50	.5	1.5	2.5
2.00	.5	2.0	2.5
3.00	.75	2.0	3.0
4.00	.75	2.5	4.0
6.00	1.0	2.5	5.0
8.00	1.0	2.5	7.0

6. DETERMINE CABLE LENGTH

Cable length = pipe length × N + heat sink adjustments × N + slack × N
 Slack = power supply (2') + tees (2' per tee) + tails (2' per tail)
 N = number of traces

7. CABLE CONTROL

It is recommended that heating cables be controlled by a thermostat to minimize energy consumption and provide appropriate temperature regulation of the pipe contents. Easy Heat provides a full range of temperature control options, as follows:

ORDINARY AREAS

T4XA, Ambient sensing thermostat – energizes cables when ambient temperature falls below setting. Setting is adjustable from 15 to 140°F (-9.4 to 60°C). NEMA 4X enclosure. Use for freeze protection applications.

C4XC Line sensing thermostat – energizes cables when line (pipe) temperature falls below 40°F (4°C). NEMA 4X enclosure. Use for freeze protection and fuel line temperature maintenance.

T4XC, Line sensing thermostat – energizes cables when line (pipe) temperature falls below setting. Setting is adjustable from 25 to 325°F (-4 to 163°C). NEMA 4X enclosure. Use for process control application, including grease lines.

HAZARDOUS LOCATIONS (CII, DIV. 2)

T9EA, Ambient sensing thermostat – energizes cables when ambient temperature falls below setting. Setting is adjustable from 15 to 140°F (-9.4 to 60°C). NEMA 4, 7 and 9 enclosure. Use for freeze protection applications.

T9EC, Line sensing thermostat – energizes cables when line (pipe) temperature falls below setting. Setting is adjustable from 25 to 325°F (-4 to 163°C). NEMA 4, 7 and 9 enclosure. Use for process control applications.

EXAMPLE

- Straight water line (105') to be maintained at 50°F.
- Minimum ambient temperature is -10°F.
- Pipe is three-inch diameter steel.
- Insulation is one inch thick mineral fiber.
- Three valves

1. CALCULATE TEMPERATURE DIFFERENTIAL

$\Delta T = T_F - T_A$
 $\Delta T = 50 - (-10)^\circ F$
 $\Delta T = 60^\circ F$

2. HEAT LOSS

Use **Table 1** to find heat loss. Where the desired temperature differential falls between two values, use interpolation: From **Table 1**:
 @ 50°F Q = 4.4 w/ft.
 @ 100°F Q = 9.2 w/ft.
 $QF = 4.4 \text{ w/ft} + 10/50 \times (9.2 - 4.4 \text{ w/ft.})$
 $QF = 4.4 + .96 = 5.4 \text{ w/ft.}$

3. ADJUSTMENT TO HEAT LOSS

Adjust the heat loss for mineral fiber. From **Table 2**, the adjustment factor is 1.2.
 $QM = QF \times 1.2$
 $QM = 5.4 \text{ w/ft.} \times 1.2$
 $QM = 6.5 \text{ w/ft.}$

Since the piping is outdoors, no adjustment is necessary for the absence of wind.

4. DETERMINE CABLE POWER

Select 8 w/ft cable. Apply single cable straight along the pipe.

5. ADJUSTMENT FOR HEAT SINKS

From **Table 3**, an additional 3 feet of cable is required at each valve.

6. DETERMINE CABLE LENGTH

Length = 105 × 1 + 3 × 3 + Slack
 Slack = 2 + 0 × 2 + 1 × 2 = 4
 Total Length = 114 + 4 = 118'

7. SELECT ACCESSORIES

- Use line sensing control T4X6 with adjustable setting set to 50°F.
- Power connection kit adjustable setting set to 50°F.
- Power connection kit

HEAT TRACE CONSIDERATIONS

1. TYPES OF HEATER CONTROL

There are two types of temperature control: ambient (air sensing) and line sensing (pipe sensing). On small projects, either of these types of control are achieved with individual component temperature controllers. On larger projects it may be advantageous, in terms of cost and maintenance, to use larger central control cabinets with electronic control.

LINE SENSING CONTROL

For line sensing control, a thermostat is used to sense the actual pipe temperature. The heater is only energized when the pipe's temperature drops below the thermostat's set point.

When controlling a heater circuit on a pipe that has both flowing and non-flowing segments (laminar flow), the sensor should be placed to best sense the temperature of non-flowing segments. On critical temperature control processes, separate heater circuits may be required.

Advantages of this system include more precise temperature control and minimum energy usage. Initial control costs and ongoing maintenance costs will rise in proportion to the number of controllers used.

SENSING AMBIENT AIR

For ambient control, the heater is turned "off" and "on" depending on the temperature of the surrounding air. The setpoint temperature to turn on the cable may be adjustable or preset (40°F is a typical value). When energizing multiple heater loads, a contactor may be used to perform the actual switching. Advantages of ambient control include simplified control wiring and lower control maintenance costs. However, excessive energy consumption and loss of precise temperature control may result (since heaters may be on when pipe temperature is warm).

2. EFFECTS OF HEAT SINKS

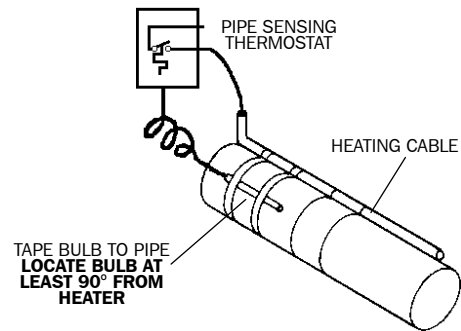
Any thermally conductive material that penetrates through the insulation pulls heat away from the pipe or vessel at a high rate. If extra heater cable is not installed at these points, the pipe may be colder in those areas, which may result in freeze-up or loss of process temperature.

3. HEAT-UP REQUIREMENTS

Heat loss tables do not include adequate power to provide rapid heat-up of pipes or vessels filled with product. Should rapid heat-up be required, extra heat must be added. This is often accomplished by using extra heaters that are turned on only in heat-up situations. Contact Easy Heat for further information.

4. HAZARDOUS AREA DESIGN CRITERIA

Heaters installed in hazardous (explosion hazard) areas must have sheath temperatures that do not exceed the ignition temperature of the hazardous gas or dust that is present. The method of limiting this temperature varies with different types of products:



Self-regulating heaters may be used based on their maximum "T Rating." Under no conditions will they exceed those temperatures.

Each heater installed in a hazardous area must have a metal shield or sheath. This provides an effective return ground path as well as providing added physical protection.

All connections and control equipment must meet the criteria for hazardous area application. For Division I applications, please consult Easy Heat.

5. NON-METALLIC SURFACES

Non-metallic pipes and vessels often have low softening and melting points. Care must be taken in design not to let the surface or heater reach that temperature.

TSR cables can be used safely without concern.

6. DESIGNING SELF-REGULATING HEATER CABLES FOR PLASTIC PIPE

Plastic pipe is not very thermally conductive, which results in less heat being transferred to plastic pipe than to metal pipe. There are three methods of applying heater cable to plastic pipe:

- a) **Regular attachment at one-foot intervals**—Attachment of cable at one foot intervals along the pipe. Sometimes adequate.
- b) **Foil over the cable**—Fasten the cable at one-foot intervals (as above) and then cover with a layer of adhesive-backed foil tape. Usually adequate
- c) **Foil over/under (sandwiched) cable**—Apply a layer of adhesive-backed foil tape on the pipe. Fasten the cable over the foil tape per a) above. Then apply another layer of foil tape over the cable. Almost always adequate.

7. USE OF METAL FOIL TAPE TO LOWER SHEATH TEMPERATURE ON METAL PIPE

Metal foil tape can be used on all types of heaters to lower sheath temperature. This should only be done to improve life expectancy. **DO NOT USE THIS TECHNIQUE TO LOWER SHEATH TEMPERATURES FOR HAZARDOUS APPLICATIONS.**

8. TEMPERATURE "PILING" IN VERTICAL INSTALLATIONS

Heat from temperature-maintained air and fluid rises. In a vertical piping run, it is possible to have a 1.5 to 3.0 degree F. rise per vertical foot of pipe in non-flow situations. Temperature control locations and circuit breakup should be used to overcome this temperature control problem.

9. STATIC vs. FLOWING FLUID CONDITIONS

Heat tracing is usually critical during stagnant flow conditions. It is very difficult to freeze or overheat a fluid which is flowing in a pipe. Most design concerns should center around static situations. For heating of fluids flowing in pipes, consult Easy Heat.

10. TERMINATION AND SEALING OF CABLE CONNECTIONS

Cable ends, splices, etc. must be properly sealed to prevent moisture entry. Condensation in junction boxes, and water leaking through insulation lagging, are common moisture sources. Moisture is a primary source of electrical arcing/failure in heating cable. Easy Heat connection kits contain appropriate components and instructions to properly seal all connections. Use only Easy Heat connection kits and follow instructions carefully.

11. FOAMED/POURED INSULATION

When heating cables are to be insulated with foamed, mudded or poured insulation, the cable must be covered by foil. This is to prevent the cable from being thermally isolated from the pipe. If thermally isolated, the cable will not get sufficient heat to the pipe.

12. INSULATION QUALITY

It is recommended that all heat traced pipes have a minimum of 1/4" of fiberglass insulation or equivalent. Heat losses of pipes without insulation are, to some extent, unpredictable and such heat traced pipes will not provide reliable performance. Water leaks (around valves, hangers and lagging lap joints) will soak insulation. The heating cable cannot maintain temperatures with wet insulations, and once the insulation becomes wet, the heating cable will not provide sufficient heat to dry it.

In addition, insulation quality must be maintained. Crushed or wet insulation will increase heat loss by 20 to 50 times the design rate.

13. ANNUAL SYSTEM CHECK-OUT

Check all freeze protection heating cable systems before each freeze season. Process maintenance systems should be checked annually. A system check should verify that all systems are functioning properly. Check and repair insulation waterproofing, spot check temperature control function, and whatever else is appropriate to your situation.

LIMITED WARRANTY AND LIABILITY

Easy Heat warrants that if there are any defects in material or workmanship in any heating cable or accessory during the first year after the date of purchase. We will provide new products to replace any defective items, or we will refund the purchase price paid for the accessory or cable, not including any labor or other installation costs. As an alternate, we may elect to repair the cable or accessory at our factory with all shipping and other removal costs borne by the purchaser.

We further warrant that any services performed for the Buyer hereunder will be performed in a good and skillful manner, based on our understanding of pertinent technical data as of the date of performance of such services. Easy Heat's sole responsibility and liability in the event of any defect, error, omission, or failure in the services rendered hereunder shall be to provide corrected services of the type provided for herein, designed to correct such defect, error, omission, or failure, and in no event shall the Easy Heat's liability with respect to such warranty exceed the amount received by it from the Buyer on account of such services.

Our obligation to provide corrected services, new products, refund the purchase price, or perform the repair described above is conditioned upon (a) the installation of the accessory or cable conforming to the specifications set forth in our installation instructions and (b) the accessory or cable not having been damaged by mechanical or electrical activities unrelated to the operation of the accessory or cable.

A refund of your purchase price, provision of replacement products, repair of the accessory or cable or provision of corrected services as described above, shall be your sole and exclusive remedy for a breach of this warranty. THESE ARE THE SOLE AND EXCLUSIVE WARRANTIES GIVEN BY EASY HEAT WITH RESPECT TO THE GOODS AND SERVICES AND ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO EASY HEAT IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT EASY HEAT'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY EASY HEAT FOR YOUR USE OR PURPOSE.

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence, unauthorized modification or alteration, use beyond rate capacity, or improper installation, maintenance or application. To the extent that you or your agents have supplied specifications, information, representation of operating conditions or other data to Easy Heat in the selection or design of the Goods and the preparation of Easy Heat's quotation, and in the event that actual operating conditions or other conditions differ from those represented by you, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

If within thirty (30) days after your discovery of any warranty defects within the warranty period, you notify Easy Heat thereof in writing, Easy Heat shall, at its option, repair, correct or replace F.O.B. point of manufacture, or refund the purchase price for, that portion of the Goods found by Easy Heat to be defective. Failure by you to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of your claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment of the repaired or replaced goods, whichever is longer.

This limited warranty does not cover any costs relating to the repair or replacement of any accessory or cable at the installation site. Our accessories and cables are not easily accessible. A failed accessory or cable usually cannot be easily repaired. Replacement of a failed accessory or cable will require that the materials under which it is installed be removed to permit replacement of the accessory or cable. **We will not reimburse any costs relating to the repair or replacement of any accessory or cable at the installation site.**

IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL EASY HEAT'S LIABILITY TO YOU AND/OR YOUR CUSTOMERS EXCEED THE PRICE PAID BY YOU FOR THE SPECIFIC GOODS PROVIDED BY EASY HEAT GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. YOU AGREE THAT WE SHALL NOT BE LIABLE TO YOU OR YOUR CUSTOMERS FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL OR PUNITIVE DAMAGES. No agent, employee or representative of ours has authority to bind us to any affirmation, representation or warranty concerning the goods sold unless such affirmation, representation or warranty is specifically incorporated by written agreement.

To obtain new products, arrange repair of existing product, or a refund under this warranty, please contact Easy Heat with a description of the defect and proof of purchase at the address noted herein.

ATTN: WARRANTY DEPARTMENT:

In US - EasyHeat Inc; 2 Connecticut South Drive, East Granby, CT 06026
In CANADA - EasyHeat Ltd; 99 Union Street, Elmira, ON N3B 3L7

