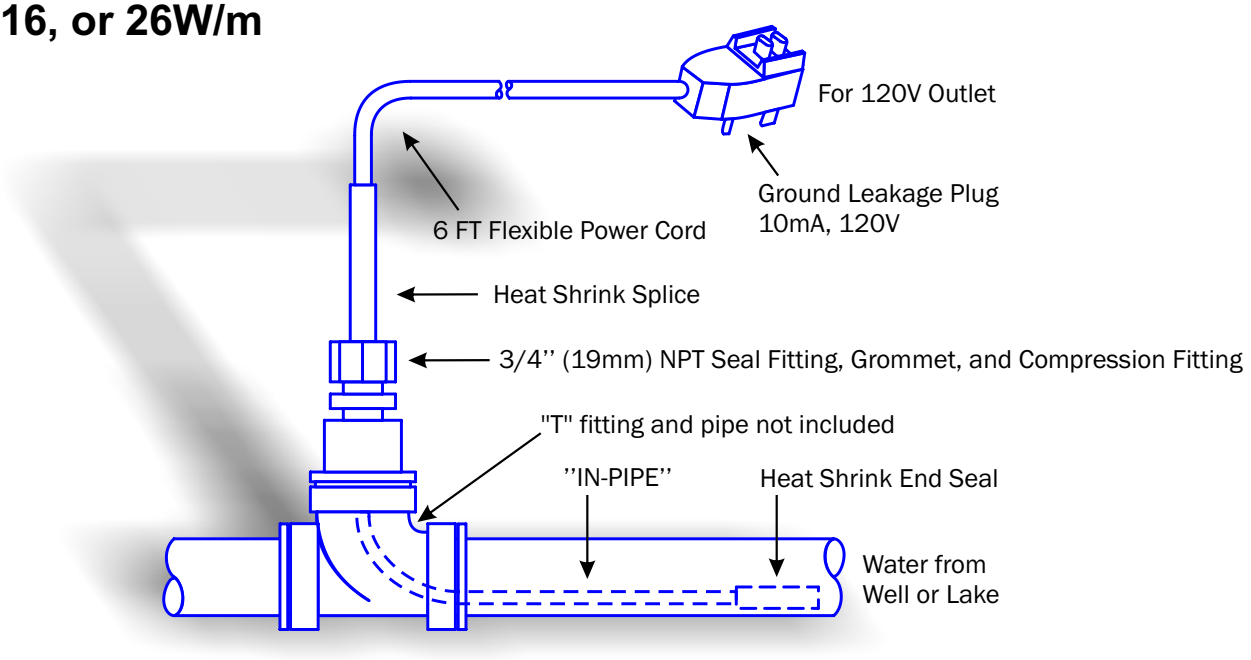
3, 5, or 8W/ft
10, 16, or 26W/m



THE PROBLEM:

Water supply pipe either not deep enough in the ground or installed on the surface, both leading to a potential pipe freeze-up.

THE SOLUTION:

Installing the Serge Baril IN-PIPE series of heat tracing cables inside your 3/4" to 2" (19mm to 50mm) pipe through a standard "T" fitting with reducers to obtain a 3/4" (19mm) standard NPT thread opening. The pre-assembled sets are supplied in pre-cut lengths with end seal and power cord installed, or the components can be bought separately and the cable field cut. Simply connect the power cord to a standard 15 Amp outlet (a dedicated circuit is suggested). It is preferable however, if the pipe is accessible, to install the CCA type of cable on the outside of the pipe and cover it with adequate insulation (see section A). The pipe must be installed with at least 1" (25mm) fibreglass or equivalent insulation. The insulation must be covered with a waterproof jacket. Remember, wet insulation is conductive and worse than no insulation.

ADVANTAGES:

- **Because of its self-regulating nature, the cable cannot damage even an empty pipe.**
- **Cut to length for the project or bought in pre-assembled cut lengths.**
- **Reduced electrical costs.**
- **Adjusts its power output where and when it is required.**
- **Very flexible, therefore easier to install.**
- **Plugs directly into a standard 120 V outlet with no electrical installation.**
- **Can be used with or without thermostat.**
- **Can be installed in most existing water lines.**

PRINCIPLE OF OPERATION:

The parallel bus wires apply voltage along the entire length of the heater cable. The conductive core provides an infinite number of parallel conductive paths permitting the cable to be cut to any length in the field with no dead or cold zones developing. The heater cable derives its self-regulating characteristic from the inherent properties of the conductive core material. As the core material temperature increases, the number of conductive paths in the core material decreases, automatically decreasing the heat output. As the temperature decreases, the number of conductive paths increases, causing the heat output to increase. This occurs at every point along the length of the cable, adjusting the power output to the varying conditions along the pipe. The self-regulating effect of these cables prevents damage to even an empty pipe. As the cable self-regulates its heat output, it provides for the efficient use of electric power, producing more heat when and where it is needed, and also limiting the maximum sheath temperature of the cable.

WHY DIFFERENT IN-PIPE WATTAGES?

3W/ft (10W/m): IN-PIPE (5FPS-2BT)

IN-PIPE at 3W/ft (10W/m) in water at 32°F (0°C) is more than adequate if all installation parameters such as insulation on the pipe, depth of installation, adequate snow cover and lake entrance under ice are met. The maximum segment length is 252ft (77m) with the use of the 15 A, 120V ground fault interrupting plug.

Note: This cable is the 5FPS-2BT in industrial applications and can be used at 240V in exceptional circumstances to provide 8W/ft (26W/m) in water at 32°F (0°C). Please verify with SBA.

5W/ft (16W/m): IN-PIPE PLUS (3FPS-1BT)

This provides 5W/ft (16W/m) in water at 32°F (0°C). It is becoming more and more popular as it provides extra protection and compensates for some installation errors and a possible lower than expected insulation value of the soil. It is however limited to 182 ft (56m) with the use of the 15 A, 120V ground fault interrupting plug. It will however provide for slightly warmer water.

Caution: This cable must not be operated at 240V as the wattage will become prohibitively high.

8W/ft (26W/m): IN-PIPE EXTRA (5FPS-1BT)

This provides 8W/ft (26W/m) in water at 32°F (0°C) for installations where no knowledge is available on the depth of the pipe in the ground and the insulation value of the installation. Certain older Mineral Insulation cable installations operated at 8W/ft (26W/m) and this cable provides a direct replacement. Again, warmer water is to be expected and the maximum circuit length is limited to 118ft (36m) with the use of the 15 A, 120V ground fault interrupting plug.

Caution: This cable must not be operated at 240V as the wattage will become prohibitively high.

HEATER CHOICES:

120 VOLTS

IN-PIPE 3W/ft (10W/m) at 32°F (0°C) (5FPS-2BT)*
IN-PIPE PLUS 5W/ft (16W/m) at 32°F (0°C) (3FPS-1BT)*
IN-PIPE EXTRA 8W/ft (26W/m) at 32°F (0°C) (5FPS-1BT)*

* The nomenclature in parenthesis is the industrial catalog number of the cable

Maximum Circuit Lengths:

120 Volts	15 Amp.		20 Amp.**		30 Amp.**		output at 32°F (0°C)			
	ft	m	ft	m	ft	m	W/ft	W/m	Amps/ft	Amps/m
IN-PIPE (5FPS-2BT)	252	77	302	92			**3**	**10**	0.022	0.072
IN-PIPE PLUS (3FPS-1BT)	182	55	242	74	270	82	**5**	**16**	0.042	0.138
IN-PIPE EXTRA (5FPS-1BT)	118	36	158	48	210	64	**8**	**26**	0.071	0.233

** above 15 Amp., use the GTCK kit to hard wire to a ground leakage circuit breaker in the distribution panel. PLEASE SEE **CAUTION** BELOW.

240 VOLTS

3FPS-2BT 5W/ft (16W/m) at 32°F (0°C)
5FPS-2BT 8W/ft (26W/m) at 32°F (0°C)

Maximum Circuit Lengths:

240 Volts	15 Amp.**		20 Amp.**		30 Amp.**		output at 32°F (0°C)			
	ft	m	ft	m	ft	m	W/ft	W/m	Amps/ft	Amps/m
3FPS-2BT	368	112	485	148	540	165	**5**	**16**	0.021	0.069
5FPS-2BT	240	73	318	97	420	128	**8**	**26**	0.035	0.233

** all these applications use a GTCK kit to hard wire to a ground leakage circuit breaker in the distribution panel.

CAUTION: To minimize the danger of a wet wire fire (arcing fault) if the heating cable is damaged or improperly installed, both the Canadian and the National Electrical Code (NEC 1996) require the use of a ground fault protection device (GFPD) at all times in conjunction with the installation of heat tracers.

GENERAL NOTE: For special wattages and lengths please contact SBA.

PRE-ASSEMBLED SETS: 120V, 15AMP

All "IN-PIPE" products are now available pre-assembled in any length requirement up to the individual maximum circuit length. Standard inventory lengths are as below:

PRE-ASSEMBLED "IN-PIPE" TRACER FOR POTABLE WATER

LENGTH		WEIGHT	
feet	meters	lbs	kg
6	1.8	2.6	1.2
10	3.0	3.1	1.4
15	4.6	3.5	1.6
20	6.1	4.0	1.8
25	7.6	4.4	2.0
30	9.1	4.8	2.2
35	10.7	5.3	2.4
40	12.2	5.7	2.6
45	13.7	6.2	2.8
50	15.2	6.6	3.0
55	16.8	7.0	3.2
60	18.3	7.5	3.4
65	19.8	7.9	3.6
70	21.3	8.4	3.8
75	22.9	8.8	4.0
80	24.4	9.2	4.2
85	25.9	9.7	4.4
90	27.4	10.1	4.6
95	29.0	10.6	4.8

LENGTH		WEIGHT	
feet	meters	lbs	kg
100	30.5	11.0	5.0
110	33.5	11.9	5.4
120*	36.6*	12.8	5.8
max. heater length for 8W/ft (26W/m)			
130	39.6	13.6	6.2
140	42.7	14.5	6.6
150	45.7	15.4	7.0
160	48.8	16.3	7.4
170	51.8	17.2	7.8
180**	54.9**	18.0	8.2
max. heater length for 5W/ft (16W/m)			
190	57.9	18.9	8.6
200	61.0	19.8	9.0
210	64.0	20.7	9.4
220	67.1	21.6	9.8
230	70.1	22.4	10.2
240	73.2	23.3	10.6
250	**76.2**	24.2	11.0
max. heater length for 3W/ft (10W/m)			

*The max. heater length for the 8W/ft (26W/m), 15A, pre-assembled units.
**The max. heater length for the 5W/ft (16W/m), 15A, pre-assembled units.

NOTES:

1) Pre-assembled units include a GFCI plug with 6' (2m) extension cord spliced to the heater cable, ¾" (19mm) NPT brass entry gland with rubber grommet, strain relief bushing & heat shrink end seal, all installed on the heater.

2) Other Specific lengths are available, please contact SBA.

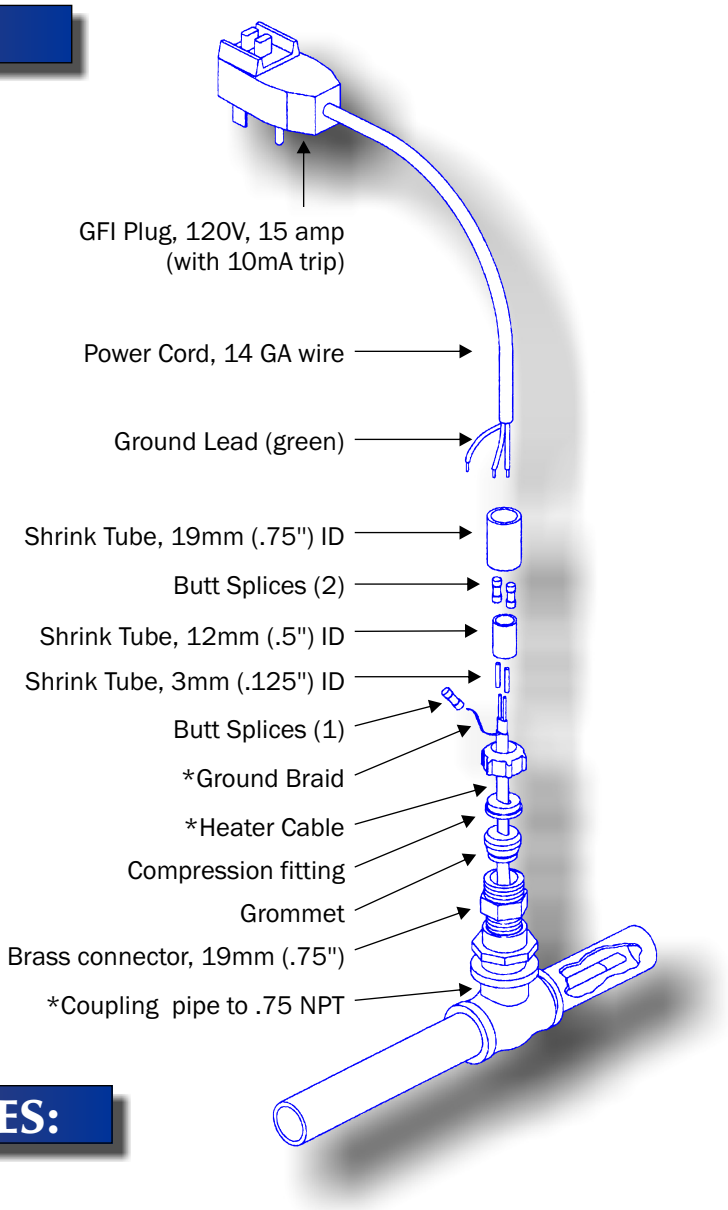
COMPONENTS:

GTKB Gut Trace Kit Bag comprising of:

GTPC 6 ft (2m) flexible power cord with 15A ground fault interrupting plug (10mA trip level);

GTCK Splice to connect the power cord to the heat tracing cable, entry power seal fitting and grommet, heat shrink end seal.

*** ITEMS NOT INCLUDED IN KIT**



INSTALLATION RELATED ISSUES:

1. SITUATIONS TO BE AVOIDED:

A) **Allowing a pipe to freeze and using the heater to unfreeze it.**
This imposes harsher conditions on the heater such as higher wattages for an extended period and pressure on the heater and pipe due to the expansion of ice.

B) **Connecting the cable at 240V to unfreeze a pipe.**
This drastically increases the amperage which could in certain circumstances dammage the interface between the conductors and the conductive core.

C) **Having the heater and pipe go through the ice at the lake level instead of under it.**
This makes the heater go through ice at potentially very low temperatures down to –40°F(C) and literally attempt to unfreeze the lake versus going under the ice at 0°C (32°F).

These conditions can rapidly deteriorate the cable and reduce its effective life.

INSTALLATION RELATED ISSUES - Continued:

2. WATER LEAKAGE:

Some heat tracing cables installed inside potable water lines may have "leakage" of water through the plug. The only circumstances that we can imagine that would create this scenario are :

A) PROBLEM: Water comes out of the plug or the splice immediately after installation.

1) **End seal tubings not well shrunk thus allowing water ingress.**

SOLUTION:

Remove the cable from the pipe and redo the end seal to assure a positive seal. Only the tubes supplied in our GTKB kit must be used due to the difficulty of sealing on the fluoropolymer jacket and also the toxicity requirements for potable water. Each tube should be shrunk individually using a rapidly moving fluffy flame or industrial heat gun. The surface of each tube needs to show a smooth glossy appearance with no flat spots and adhesive flowing out the ends. Wait until the tubes are cold before further handling the cable.

2) **Hole in outer jacket of the cable – the cable has been nicked during installation or handling.**

SOLUTION:

Remove and replace the cable. The two lengths, once the damaged section has been removed, can be used for shorter installations.

B) PROBLEM: Water comes out of the splice or the plug after having operated for some time. The cable jacket has been pierced (pin-hole) due to a lightning strike in the area causing the water to instantaneously reach a level of voltage high enough to pierce the outer jacket and thus reach the ground braid.

SOLUTION:

A) The best and safest - remove the cable and replace it.

B) Live with it by draining the water at the splice level. Some people have done this. However we cannot sanction or recommend it as the braid could gradually corrode leaving the ground leakage protection inoperative.

3. INSULATION:

PROBLEM:

A) Little or no insulation or lack of waterproofing over insulation.

B) Use of insulation that does not completely cover the pipe leaving an open crack or slot with direct access to the pipe which could cause a freeze-up.

SOLUTION:

For an above ground installation, the equivalent of 1" (25 mm) of fibreglass (R4) is required. This needs to be waterproofed. Insulation and waterproofing may also be required even if the pipe is underground, depending on circumstances such as: depth, water in soil, type of soil, snow cover, etc.

4. SURGE SUPPRESSION:

The installation of a surge protection system is becoming more and more common and is not only recommended but required in numerous circumstances. This will protect the cable against high voltage surges which could damage the interface between the bus wires and the conductive core. Damages to the interface can affect the cables power output and may eventually render the cable inoperative.