

# CARAPACE®

*The Only Certified Rural and Municipal Freeze Protected Water Supply Pipe.*

CARAPACE is a high performance, freeze protected (heated), HDPE polyethylene water pipe designed for use in municipal or domestic water supply and sewage force main applications.

Available as a complete job-ready system or on 1000 foot reels for field splicing and terminating.



Patents USA and Canada





## UNIQUE, PATENTED PRODUCT

CARAPACE is a unique, patented product constructed of high density polyethylene pipe (HDPE) with a proprietary self-regulating heating cable extruded directly onto the outer surface of the pipe. The heating cable is then mechanically protected by a high density polyethylene outer jacket or shell, ensuring the conductive core of the heating cable remains in continuous contact with the pipe wall while protecting it from mechanical injury.

The special construction of CARAPACE provides superior thermal heat transfer and unsurpassed energy efficiency when combined with thermal insulation and a thermostat.

CARAPACE is available in two options depending on job requirements. CARAPACE can be supplied factory finished to a specified length with power and end terminations installed or as a cut-to-length product for field measuring and terminating.

## ALTERNATIVE TO EXCAVATING

CARAPACE is an excellent alternative to costly excavating and blasting of rock or wherever permanent or temporary reliable freeze protection is required. The durability and termination flexibility of CARAPACE renders it a suitable product for a vast variety of applications, including residential, agriculture, commercial, industrial, mining and exploration, remote camps and construction.

## DIRECT EARTH BURIAL

CARAPACE is a CSA B137.1, NSF 14-61 approved product constructed with high density PE 4710 polyethylene for portability and is approved for direct earth burial and free air installations.

CARAPACE Rural Grade is available in 120 volt and 240 volt and sized in SIDR (internal diameter), 200 PSI rated, high density polyethylene. CARAPACE Rural Grade 250 PSI rated is also available by special order.

CARAPACE Municipal Grade is available in 240 volt and sized in CTS (copper tube size), 250 PSI rated, high density polyethylene. 120 volt Municipal Grade is available by special order.

Pipe temperatures can be maintained using insulation and thermostatic control.

# CARAPACE®



## MUNICIPAL AND DOMESTIC FREEZE PROTECTION

CARAPACE is a high performance product designed to provide energy efficient and reliable municipal and domestic pipe freeze protection.

## ELIMINATES STEAMING OR JETTING OUT PIPES

CARAPACE can be used continuously through winter as freeze protection or as a precautionary system in problematic geographies. In this case, as freeze-maintenance on the fringe of the frost line, the system can simply be energized in the event of a freeze. Water will begin flowing in minutes, preventing and eliminating the costly expense and need to steam or jet out pipes.

# CARAPACE® | Energy Consumption Case Study

Location Information	Nearest city / town	Carnarvon, ON CANADA
	Latitude	45°02'43"N
	Longitude	78°41'53"W
	Elevation (above sea level)	1,090 feet
Lake Information	Lake bed	Sand
	Obstructions	None
	4 foot water depth	110 feet from shoreline
	10 foot water depth	150 feet from shoreline
	20 foot water depth	170 – 180 feet from shoreline
Property Information	Elevation (above lake level)	30 – 40 feet
	Terrain	Rock
	Shoreline	Rock
Product Information	Product	CARAPACE, 1" Rural (ID controlled), 240 volt, 5w @ 50°F
	System length	270 feet (90 on land, 180 in the lake)
	Pipe insulation on land	Yes (90 feet)
	Pipe insulation in lake	None
	Ground coverage	None (could not bury)
	Thermostat	Yes
	Thermostat setting	50°F (10°C)
	Sensor location	45 feet from building on pipe under insulation (coldest point)
Test Results	CARAPACE was powered on November 10, 2007	
	CARAPACE was shut down on April 25, 2008	
	70 Days of Recorded Temperatures from November 10, 2007 to April 25, 2008	
	Coldest recorded temp.	-27.4°F (-33°C)
	Warmest recorded temp.	48.2°F (9°C)
	Average temp.	17.7°F (-8°C)
	Kilowatt usage	1,821 kW/h
	Price per kw/h (April 2008)	\$0.05
	Cost for entire CARAPACE operation	\$91.05

## Disclaimer

Energy consumption will change depending on product selection, application, location and climate. This case study should be used as an example only, but exemplifies the high performance capability of the product.



# CARAPACE® | Technical Specifications

	Rural grade	Municipal grade
Pipe pressure rating	200 PSI 250 PSI available by special order	250 PSI
Available pipe sizes	ID Controlled 1" and 1¼"	Copper Tube Size 1" (1¼" by special request)
Inner pipe construction	High Density Polyethylene PE 4710	High Density Polyethylene PE 4710
Outer extruded membrane	High Density Polyethylene PE 4710	High Density Polyethylene PE 4710
NSF approval for potable water	14/61	14/61
CSA approval for potable water	B137.1	B137.1
ASTM approvals	D2737	D2737
Withstand petroleum products?	Yes – Verify with factory for type of petroleum, ordinary electrical class only. NOT hazardous locations	Yes – Verify with factory for type of petroleum, ordinary electrical class only. NOT hazardous locations
Heat distribution	Adjusts heat output microscopically at every point in its length in response to temperature	Adjusts heat output microscopically at every point in its length in response to temperature
Heating cable – class	Self-Regulating	Self-Regulating
Heating cable – jacket	Fluoropolymer	Fluoropolymer
Heating cable – core	Conductive Polymer	Conductive Polymer
Cable wattages available	3W/ft, 5W/ft	3W/ft, 5W/ft
Voltages available	120, 240, 208-277	240, 208-277 120 volt by special order
Max circuit length, 3 watt 120 volt	270 ft	120 volt by special request only
Max circuit length, 5 watt 120 volt	230 ft	120 volt by special request only
Max circuit length, 3 watt 240 volt	660 ft	660 ft
Max circuit length, 5 watt 240 volt	540 ft	540 ft
Maximum length /reel	1000 ft	1000 ft
cCSAus NSF approvals	Yes	Yes
Warranty	5 year limited warranty/ 10 year optional	5 year limited warranty/ 10 year optional



# CARAPACE<sup>®</sup> Features / Benefits / Differentiators / Applications / Redundancy

## Features

- Made of potable HDPE
- Available in 1" and 1¼" SIDR sizes and 1" CTS size
- Thermostats and other control devices are optional
- Will not melt or overheat
- Can be fully insulated
- Extremely energy efficient
- Available in 120 volt or 240 volt systems
- Available with either GFCI plug or CS hard wire connection
- Self-regulating, high performance, conductive polymer cable
- 5 year limited warranty/ 10 year optional
- Available in common and custom lengths

## Benefits

- Interfaces with standard fittings known in the trade
- Durable for applications above ground
- Available on 1000 foot reels for field cutting and terminating
- Limits or eliminates trenching and/or blasting
- Inherent mechanical protection
- Application flexibility
- Fast installation
- Proven performance in extreme cold climates
- Each finished system is tested prior to shipment
- Single trade installation
- Manufactured to finished lengths for individual service requirements
- Can be insulated to maximize energy efficiency
- Thermostats not required for applications where they are not beneficial
- No high limit devices required
- Unlimited control options

## Differentiators

- The only fully certified, complete, integral freeze protected pipe
- CSA B137.1 approved (CANADA)
- NSF 14/61 approved in the USA for potability
- Manufactured in North America
- cCSAus approved for installation throughout the USA and Canada
- Clear, concise installation and support documentation
- Will not melt or overheat pipe
- Available in short, long and custom lengths
- Extremely High Quality and Excellent Warranty

## Applications

- Frozen sites where water is required
- Residential water supply
- Municipal water supply
- Sewage force mains
- Whenever deep blasting would be required to reach frost line
- Floating docks/ sea walls
- Bridge crossings
- Construction sites
- Mining / oil / gas sites (ordinary locations)
- Shallow trenches
- Remote camps
- Ground source heat pump headers

## Redundancy

- CARAPACE can be used as a backup system
- When pipes are installed on the fringe of the frost line or in critical areas under roadways etc.,
- CARAPACE can be energized if freezing occurs, restoring water flow in minutes while preventing the need for costly jetting or steaming of pipes

# CARAPACE® | Product Codes

## CARAPACE (Pre-Assembled and Factory Finished)

Example: **CR2 - 5 - 125 - 100 - GFC or CS**

Product		Cord-Set Type		CS (No GFCI) Cord Connected	Note: "CS" systems must provide 20 Amp circuits for circuit lengths greater than 550 ft for 3 watt CARAPACE and 460 ft for 5 watt CARAPACE.
CR	Rural, SIDR 200 psi, 120 volt	GFC Ground Fault Protected	<i>Max length</i>	<i>Max length</i>	
CR2	Rural, SIDR 200 psi, 240 volt				
CM2	Municipal, CTS 250 psi, 240 volt, ONLY				
Wattage		Length of CARAPACE (ft)			
5	5 Watt self-regulating heater	3 watt / 120 volt	270 ft	270 ft	
3	3 Watt self-regulating heater	5 watt / 120 volt	230 ft	230 ft	
		3 watt / 240 volt	550 ft	660 ft	
		5 watt / 240 volt	460 ft	540 ft	
Pipe Size					
100	Pipe size 1" (CR - I.D. controlled) (CM - O.D. CTS)				
125	Pipe size 1¼" (CR - I.D. controlled)				

## CARAPACE (Rural) (Sold in 1000 ft reels) *Internal diameter controlled*

Example: **RHPE2 - 5 - 100**

Product		Pipe Size	
RHPE	SIDR 200 psi, 120 volt	100	Pipe size 1"
RHPE2	SIDR 200 psi, 240 volt	125	Pipe size 1¼"
Wattage			
5	5 Watt self-regulating heater		
3	3 Watt self-regulating heater		

## CARAPACE (Municipal) (Sold in 1000 ft reels) *Copper Tube Size*

Example: **MHPE2 - 3 - 100**

Product		Pipe Size	
MHPE2	CTS, 250 psi, 240 volt	100	Pipe size 1"
Wattage			
5	5 Watt self-regulating heater		
3	3 Watt self-regulating heater		

# CARAPACE® | Accessories

Product Code	Description
CR-HTLN-CKIT	CSA CS100 Power Connection & CESS End Seal Kit
CR-HTLN-CS100	CSA Power Connection Kit
CR-HTLN-CESS	CSA End Seal Boot Kit
GF-STAT	Ground Fault Protected Thermostat 120 volt/240 volt