# 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 potability 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.

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 hiperformance capability of the product.	

### CARAPACE ® | Technical Specifications Rural grade Municipal grade 200 PSI 250 PSI Pipe pressure rating 250 PSI available by special order Copper Tube Size 1" ID Controlled 1" and 11/4" Available pipe sizes (11/4" 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 14/61 14/61 water CSA approval for potable B137.1 B137.1 water ASTM approvals D2737 D2737 Withstand petroleum prod-Yes – Verify with factory for type of Yes – Verify with factory for type of ucts? petroleum, ordinary electrical class petroleum, ordinary electrical class only. NOT hazardous locations only. NOT hazardous locations Heat distribution Adjusts heat output microscopically Adjusts heat output microscopically at every point in its length in reat every point in its length in response to temperature sponse 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 240, 208-277 Voltages available 120, 240, 208-277 120 volt by special order Max circuit length, 3 watt 120 270 ft 120 volt by special request only volt Max circuit length, 5 watt 120 230 ft 120 volt by special request only Max circuit length, 3 watt 240 660 ft 660 ft volt 540 ft

Max circuit length, 5 watt 240

Maximum length /reel

cCSAus NSF approvals

volt

Warranty

540 ft

1000 ft

5 year limited warranty/

10 year optional

Yes



1000 ft

5 year limited warranty/

10 year optional

Yes



### CARAPACE ® Features / Benefits / Differentiators / Applications / Redundancy • Made of potable HDPE • Available in 120 volt or 240 volt sys-**Features** • Available in 1" and 11/4" SIDR sizes tems and 1" CTS size • Available with either GFCI plug or CS hard wire connection • Thermostats and other control devices are optional • Self-regulating, high performance, conductive polymer cable • Will not melt or overheat • 5 year limited warranty/ 10 year op-• Can be fully insulated • Extremely energy efficient Available in common and custom lengths • Interfaces with standard fittings • Each finished system is tested prior to Benefits known in the trade shipment • Durable for applications above • Single trade installation around • Manufactured to finished lengths for • Available on 1000 foot reels for field individual service requirements cutting and terminating • Can be insulated to maximize energy • Limits or eliminates trenching and/ efficiency or blasting • Thermostats not required for applica-• Inherent mechanical protection tions where they are not beneficial Application flexibility • No high limit devices required • Fast installation • Unlimited control options • Proven performance in extreme cold climates • The only fully certified, complete, • cCSAus approved for installation Differentiators integral freeze protected pipe throughout the USA and Canada • CSA B137.1 approved (CANADA) • Clear, concise installation and support documentation • NSF 14/61 approved in the USA for Will not melt or overheat pipe potability • Manufactured in North America • Available in short, long and custom lengths Extremely High Quality and Excellent Warranty • Frozen sites where water is required • Bridge crossings **Applications** • Construction sites Residential water supply Municipal water supply • Mining / oil / gas sites (ordinary locations) • Sewage force mains Shallow trenches • Whenever deep blasting would be required to reach frost line • Remote camps • Floating docks/ sea walls • Ground source heat pump headers • CARAPACE can be used as a back-• CARAPACE can be energized if Redundancy up system freezing occurs, restoring water flow

• When pipes are installed on the

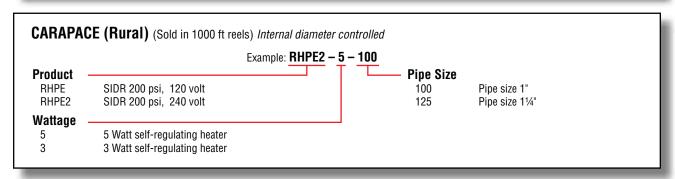
areas under roadways etc.,

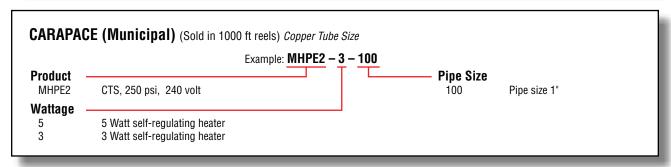
fringe of the frost line or in critical

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 Note: "CS" systems **GFC** CR Rural, SIDR 200 psi, 120 volt CS (No GFCI) must provide 20 Amp CR2 Rural, SIDR 200 psi, 240 volt **Ground Fault Protected Cord Connected** circuits for circuit lengths greater than CM2 Municipal, CTS 250 psi, Max length Max length 550 ft for 3 watt 240 volt, ONLY 3 watt / 120 volt 270 ft 270 ft CARAPACE and 460 ft 5 watt / 120 volt 230 ft 230 ft for 5 watt CARAPACE. Wattage 3 watt / 240 volt 550 ft 660 ft 5 Watt self-regulating heater 5 watt / 240 volt 460 ft 540 ft 3 3 Watt self-regulating heater Length of CARAPACE (ft) Pipe Size Pipe size 1" (CR - I.D. controlled) 100 (CM - 0.D. CTS) 125 Pipe size 11/4" (CR - I.D. controlled)





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