

File E348956  
Project 4786451325

July 24, 2015

REPORT

on

COMMERCIAL PIPE HEATING CABLE

E-POLY TECHNOLOGY CORP  
HSINCHU CITY, TAIWAN

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## DESCRIPTION

## PRODUCT COVERED:

USL, CNL - Commercial Pipe Heating Cable, Series PFPC1-1A, f/b 003-080.

## GENERAL:

These products are factory-assembled indoor heating cables intended to reduce the likelihood of water freezing in commercial pipes. The heating cables are series type construction provided with a flexible cord and attachment plug, molded splice assembly, and molded end seal assembly.

## ELECTRICAL RATINGS:

120 V, 60 Hz, 7 W/ft.

CATALOG NUMBER	LENGTH, ft.	POWER, W	CURRENT, A
PFPC1-1A003	3	21	0.18
PFPC1-1A006	6	42	0.35
PFPC1-1A009	9	63	0.51
PFPC1-1A012	12	84	0.70
PFPC1-1A015	15	105	0.88
PFPC1-1A018	18	126	1.05
PFPC1-1A024	24	168	1.40
PFPC1-1A030	30	210	1.75
PFPC1-1A040	40	280	2.34
PFPC1-1A060	60	420	3.50
PFPC1-1A080	80	560	4.67

## GENERAL RATINGS (NOT FOR UL REPRESENTATIVE USE):

Maximum ambient temperature	15°C
Maximum continuous exposure temperature (heating device de-energized)	90°C
Maximum continuous operating temperature (heating device energized)	25°C
Maximum heating device sheath temperature (heating device energized)	90°C
Maximum intermittent exposure temperature (heating device energized or de-energized)	105°C
Maximum sheath temperature	65°C
Minimum installation temperature	0°C
Sheath temperature	105°C
Rated output	7 W/ft
Minimum Bend Radius	8 mm
Minimum declared start-up temperature	-20°C
Maximum allowable branch circuit overcurrent protection	20 A
Maximum insulation thickness, faced	1/2 in.

## NOMENCLATURE:

Example: PFPC1-1A003

PFPC1	1	1	A	XXX
A	B	C	D	E

A	PFPC = Pipe freeze protection heating cable series
B	1 = 120V
C	1 = NEMA 5-15 plug type
D	A = Nonheating lead wire size, 16 AWG
E	Length of heating cable in feet, 003-080

## TECHNICAL CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE):

USL indicates investigation to UL 515 Second Edition, and IEEE 515.1 First Edition.

CNL indicates investigation to CSA C22.2 No. 130-03, dated January 2008, the standard for Requirements for Electrical Resistance Heating Cables and Heating Device Sets (Type "-G").

## CONSTRUCTION DETAILS:

## Product Marking:

See Section General. CSA 130-03 Table 1 marking is -G.

## Packaging Markings:

See Section General.

## INSTALLATION INSTRUCTIONS:

See ILL. 1. Included with each shipment. The instructions shall include a statement that pipe heating cable Series PFPC1-1A shall only be used on nonmetallic pipe rated for a minimum 105°C. The instructions may additionally indicate that Series PFPC1-1A may be used on metallic pipe.

## Series PFPC1-1A003 - FIG. 1

1. Power Supply Cord Set - Listed ELBZ/CN. Type SJTW, 16/3 AWG, minimum 125 V, 60°C. Minimum 2 feet and maximum 6 feet long. Provided with molded-on grounding type NEMA 5-15P or 5-20P attachment plug.
2. Splice Housing - R/C (QMTT2). TECHNOR APEX CO. (E73402), Type APEX 84458 (105°C, VW-1). See ILL. 2.
3. Thermostat Cover - Same material as Splice Housing. Minimum 1.45 mm thick. See ILL. 2.
4. Thermostat - R/C (XAPX2/8). DONGGUAN KAIN ELECTRONIC SCI & TECH CO, LTD., (E343948), Type KI31. (Rated 120 V, 60 Hz, minimum 6 A). (Normally open; Operating 14 +/- 3°C; reset 4 +/- 3°C for energy management purpose only.)
5. Resistance Wire Connector - Listed (ZMVV/7). KS TERMINALS INC (E96029), Model PNT1. Assembled with Wynns Tools Co., Ltd., Type HD-6L. Leads crimped in parallel and then soldered. See ILL. 2.
6. Ground Wire Connector - Listed (ZMVV/7). KS TERMINALS INC (E96029), Model PNT2. Assembled with Wynns Tools Co., Ltd., Type HD-6L. . See ILL. 2.
7. Splice Insulation Tubing - R/C (YDPU2/8). HONGSHANG HEAT SHRINKABLE MATERIALS CO LTD (E204071), Type H-5. (Rated 125°C, 600 V, VW-1). Measures 0.5 mm thick, 30 mm long, 6 mm ID before shrinking. See ILL. 2.
8. Heating Cable - R/C (AVLV2/8). E-POLY TECHNOLOGY CORP, (E353368), Style 2775. (105°C, 250 Vac, Cable flame, 75°C Wet). See ILL. 2.
  - a. Resistance Wire - Two conductors spirally wound around a core, constructed as noted below.

Model	Length, ft.	AWG
PFPC1-1A003	3	38
PFPC1-1A006	6	38
PFPC1-1A009	9	38
PFPC1-1A012	12	38
PFPC1-1A015	15	38
PFPC1-1A018	18	38
PFPC1-1A024	24	38
PFPC1-1A030	30	27
PFPC1-1A040	40	27
PFPC1-1A060	60	27
PFPC1-1A080	80	28

- b. Core - Fiberglass filler.
  - c. Insulation - R/C (QMTT2). TECHNOR APEX CO. (E73402), Type APEX 80851-B, 0.8 mm minimum thick. (PVC).
  - d. Braid - Tinned copper, bare copper, or copper alloy (minimum 80% coverage; FUS tested).
  - e. Jacket - R/C (QMTT2). TECHNOR APEX CO. (E73402), Type APEX 84458, 1.2 mm minimum thick. (PVC).
9. End Seal - Same material as Splice Housing. See ILL. 2.
10. Cord Tag Label - R/C (PGDQ2), CORDIALITY LABEL PRINTING (SHENZHEN) CO LTD., (MH26640), Model CPPC-12 (outdoor use).

## A P P E N D I X A

## INSTRUCTIONS TO THE INSPECTOR

FOR SAMPLE PICK UP

INSPECTOR:

Once each year select representative samples of each component in the quantity specified.

For Test E - These specimens should be marked with appropriate identification, including date and lot of production, and forwarded to the UL Camas, "Attention: Follow-Up Services."

GENERAL:

Components subject to follow-up test:

E. Shield Coverage Verification

(1) Shield Coverage Determination.

SAMPLE SELECTION GUIDE

RADIANT HEATING CABLE:

Description	Section	Quantity
Residential Pipe Heating Cable, Series PFPC1-1A, f/b 003-080 - Heating cable	1	3 feet of heating cable

## D. Material Identification Tests

## 1. Qualitative Infrared Analysis:

## Method

An infrared spectrum of the material is to be obtained by means of an infrared spectrophotometer. Instrument settings used in obtaining the spectrum are to be identical to those used in obtaining the original spectrum of the material referenced in this Procedure.

## Basis For Acceptability

The spectrum obtained shall indicate the same composition as that recorded in the spectrum obtained under the original investigation.

## 2. Thermogravimetry:

## Method

A thermogram of the material is to be obtained by means of a thermal analyzer with a thermogravimetric module. Instrument settings used in obtaining the thermogram are to be identical to those used in obtaining the original thermogram of the material referenced in this Procedure.

## Basis For Acceptability

The thermogram obtained shall indicate the same characteristic weight loss over the programmed temperature range as that recorded in the thermogram obtained under the original investigation.

## 3. Differential Scanning Calorimetry:

## Method

A thermogram of the material is to be obtained by means of a thermal analyzer with a DSC (Differential Scanning Calorimeter) module. Instrument settings used in obtaining the thermogram are to be identical to those used in the original thermogram of the material referenced in this Procedure.

## Basis For Acceptability

The thermogram obtained shall indicate the same general thermal response over the programmed temperature range as that recorded in the thermogram obtained under the original investigation.



- E. Shield Coverage Verification
- 1. Shield Coverage Determination.

Method

When specified in the Follow-Up Service Procedure, the cable is to be checked for the percentage of shield coverage. The percentage is to be checked by obtaining, through physical examination, the items noted in Braid and Serving Coverage Section 228 in UL 1581.

Basis For Acceptability

The measurements should equal to or greater than the value recorded on under INDEX TO TESTING

INDEX TO TESTING

Section	Required Coverage	Minimum	Braid
1	80%		



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FOLLOW-UP SERVICE PROCEDURE  
(TYPE R)

INDUSTRIAL AND COMMERCIAL PIPE-HEATING CABLE  
(KQXR, KQXR7)

Manufacturer: SEE ADDENDUM FOR MANUFACTURER LOCATIONS

Applicant: 654362 (Party Site)  
(100096-983) E-POLY TECHNOLOGY CORP  
3Rd Fl-3  
1 Lane 162 Zhongyang Rd  
Hsinchu City  
300 TAIWAN

Listee/Classified Co.: 654362 (Party Site)  
(100096-983) SAME AS APPLICANT

This Follow-Up Service Procedure authorizes the above Manufacturer(s) to use the marking specified by UL LLC, or any authorized licensee of UL LLC, including the UL Contracting Party, only on products when constructed, tested and found to be in compliance with the requirements of this Follow-Up Service Procedure and in accordance with the terms of the applicable service agreement with UL Contracting Party and any applicable Service Terms. The UL Contracting Party for Follow-Up Services is listed on addendum to this Follow-Up Service Procedure ("UL Contracting Party"). UL Contracting Party and UL LLC are referred to jointly herein as "UL."

UL further defines responsibilities, duties and requirements for both Manufacturers and UL representatives in the document titled, "UL Mark Surveillance Requirements" that can be located at the following web-site: <http://www.ul.com/fus> and in the document titled "UL and Subscriber Responsibilities" that can be located at the following website: <http://www.ul.com/responsibilities>. Manufacturers without Internet access may obtain the current version of these documents from their local UL customer service representative or UL field representative. For assistance, or to obtain a paper copy of these documents or the applicable Service Terms, please contact UL's Customer Service at <http://ul.com/aboutul/locations/>, select a location and enter your request, or call the number listed for that location.

The Applicant, the specified Manufacturer(s) and any Listee/Classified Co. in this Follow-Up Service Procedure must agree to receive Follow-Up Services from UL Contracting Party. If your applicable agreement is a Global Services Agreement ("GSA") with an effective date of January 1, 2012 or later and this Follow-Up Service Procedure is issued on or after that effective date, the Applicant, the specified Manufacturer(s) and any Listee/Classified Co. will be bound to a Service Agreement for Follow-Up Services upon the earliest by any Subscriber of use of the prescribed UL Mark, acceptance of the factory inspection, or payment of the Follow-Up Service fees which will incorporate such GSA, this Follow-Up Service Procedure and the Follow-Up Service Terms which can be accessed by clicking here: <http://www.ul.com/contracts/Terms-After-12-31-2011>. In all other events, Follow-Up Services will be governed by and incorporate the terms of your applicable service agreement and this Follow-Up Service Procedure.

It is the responsibility of the Listee/Classified Co. to make sure that only the products meeting the aforementioned requirements bear the authorized Marks of UL LLC, or any authorized licensee of UL LLC.

This Follow-Up Service Procedure contains information for the use of the above Manufacturer(s) and representatives of UL and is not to be used for any other purpose. It is provided to the Manufacturer with the understanding that it will be returned upon request and is not to be copied in whole or in part.

This Follow-Up Service Procedure, and any subsequent revisions, is the property of UL and is not transferable. This Follow-Up Service Procedure contains confidential information for use only by the above named Manufacturer(s) and representatives of UL and is not to be used for any other purpose. It is provided to the Subscribers with the understanding that it is not to be copied, either wholly or in part unless specifically allowed, and that it will be returned to UL, upon request.

Capitalized terms used but not defined herein have the meanings set forth in the GSA and the applicable Service Terms or any other applicable UL service agreement.

UL shall not incur any obligation or liability for any loss, expense or damages, including incidental, consequential or punitive damages arising out of or in connection with the use or reliance upon this Follow-Up Service Procedure to anyone other than the above Manufacturer(s) as provided in the agreement between UL LLC or an authorized licensee of UL LLC, including UL Contracting Party, and the Manufacturer(s).

UL LLC has signed below solely in its capacity as the accredited entity to indicate that this Follow-Up Service Procedure is in compliance with the accreditation requirements.

Bruce A. Mahrenholz  
Director  
North American Certification Program

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Authorization Page Revised: 2015-07-27

LOCATION

(100573-423) 638716 (Party Site)  
YANGZHOU E-POLY TECHNOLOGY CO LTD  
12 Lingbo Rd  
Gaoyou Economic Development Zone  
Gaoyou  
Yangzhou  
Jiangsu 225600 CHINA  
Factory ID: None  
UL Contracting Party for above site is: UL AG

Model	Section	Requirements Evaluated to
Commercial Pipe Heating Cable, Series PFPC1-1A, f/b 003-080 representing Length of heating cable in feet.	1	USL, CNL

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only.

The word "LISTED" shall be in either the four or six o'clock position with respect to the UL symbol (see example below). Minimum size of the Listing Mark is not specified, as long as it is legible. The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL symbol is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible. Camera-ready artwork and relative proportions are available online at [www.ul.com](http://www.ul.com).



XXXX = The control number assigned by UL, E348956.

The product identity is: "HEATING CABLE," "PIPE HEATING CABLE" or "PIPE-HEATING SYSTEM," or other appropriate product identity as shown in the individual Listing.

The product identity may appear elsewhere on the product when the other three elements are directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process or part of the nameplate that includes the rating or the catalog or model designation.

A separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) shall always include the four elements.

PROCUREMENT

The manufacturer may reproduce the Mark or obtain it from an authorized label supplier. Authorized label suppliers can be found online at [www.ul.com](http://www.ul.com).

THIS PAGE SHALL BE REVISED BY UL LABEL OPERATIONS ONLY

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The Canadian/US symbol shall be used if both Canadian and US coverage is authorized (see example below).



[PRODUCT IDENTITY]  
XXXX

The Canadian symbol shall be used if only Canadian coverage is authorized (see example below).



[PRODUCT IDENTITY]

XXXX = The control number assigned by UL, E348956.

The product identity is: "HEATING CABLE," "PIPE HEATING CABLE" or "PIPE-HEATING SYSTEM," or other appropriate product identity as shown in the individual Listing.

The product identity may appear elsewhere on the product when the other three elements are directly and permanently applied to the product by stamping, molding, ink-stamping, silk-screening or similar process or part of the nameplate that includes the rating or the catalog or model designation.

A separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) shall always include the four elements.

PROCUREMENT

The manufacturer may reproduce the Mark or obtain it from an authorized label supplier. Authorized label suppliers can be found online at [www.ul.com](http://www.ul.com).

THIS PAGE SHALL BE REVISED BY UL LABEL OPERATIONS ONLY

GENERAL

PRODUCT COVERED:

Commercial pipe heating cable.

METHOD OF MARKING:

NOTE: The UL Listing Mark can be applied to product(s) or packaging and can be separate from nameplate label, ratings label, or any other required label.

Accessories (kits) can be marked with the UL Listing Mark if a statement is included that it is part of a Listed system for Model .

METHOD OF MARKING OF THE NAMEPLATE LABEL:

Factory Assembled Models: Cord tag



## MARKINGS REQUIRED:

(IEEE 515.1-2005)

1. (IEEE 515.1, Sec. 5.1) Product markings for heating devices: Heating devices intended for field fabrication shall be clearly and permanently surface marked with the following information:
  - a. The name of the manufacturer, trademark, or other recognized symbol of identification.
  - b. The catalog number, reference number, or model.
  - c. The month and year of manufacture, date coding, applicable serial number, or equivalent.
  - d. The rated voltage for parallel heating devices or maximum operating voltage for series heating devices. See individual Section for type.
  - e. The rated power output in watts per unit length at the rated voltage (and at a stated temperature for devices that change output with temperature), the resistance in ohms per unit length for series cable, or the operating current or total wattage, as applicable.
  - f. Agency listing or approval.
  
2. (IEEE 515.1, Sec. 5.2) Markings for field-assembled components: Field-assembled components shall be marked with the following information. In the case of components with small surface areas, or surfaces where legible printing cannot be applied, the markings may be placed on the smallest unit container in lieu of the component itself:
  - a. The name of the manufacturer, trademark, or other recognized symbol of identification.
  - b. The catalogue number, reference number, or model.
  - c. The month and year of manufacture, date coding, applicable serial number, or equivalent.
  - d. Agency listing or approval.
  - e. Applicable environmental or area use requirements, such as NEMA 4, Type 4, IP ratings, and hazardous (classified) locations markings including temperature rating.
  - f. Any applicable warning.

(UL 515)

3. (UL 515, Sec. 13.1) Heat tracing intended for commercial applications shall comply with the markings specified in IEEE 515.1, Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Commercial Applications.

(CSA 130-03)

4. (CSA 130-03, Sec. 4.1.2) All heating devices and heating device sets shall be marked for the specific use described in Table 1 and comply with Annex A and B.

## 5. (CSA 130-03, Sec. 5.1) Packaging

The original carton, container, spool, or reel in or on which the heating device or heating device set leaves the factory shall be clearly marked with the following information:

- a. the manufacturer's name, trademark, or other recognized symbol of identification;
- b. the catalogue number, reference number, or model;
- c. the month and year of manufacture, date code, applicable serial number, or equivalent;
- d. the words "Refer to installation instructions", or equivalent wording, and any applicable notices, warnings, and directions to the installer;
- e. the warning "CAUTION: a ground fault protection device must be used with this heating device" and "ATTENTION : ce produit doit être utilisé avec une protection de mise à la terre" unless exempted by the Canadian Electrical Code, Part I, except that products not complying with Clause 4.3.4.1 shall always be so marked;
- f. the maximum voltage for which the heating device or heating device set is intended;
- g. the maximum rated current or, for factory-assembled heating device sets, the total wattage;
- h. the rated output of the device expressed in total watts, watts per unit length, or watts per unit area at a reference temperature, if applicable;
- i. the words "heating cable", "heating cable set", "surface heating device", or "surface heating device set", and usage marking and usage; See individual Section for designation.
- j. the manufacturer's declared minimum installation temperature; and
- k. an explanation of -X marking for specific applications. See individual Section for -X designation.

## 6. (CSA 130-03, Sec. 5.3.1) Heating Devices intended for field assembly shall be clearly and permanently marked with the following information:

- a. the manufacturer's name, trademark, or other recognized symbol of identification;
- b. the catalogue number, reference number, or model;
- c. the month and year of manufacture, date code, applicable serial number, or equivalent;
- d. the word "series" or "parallel" and the usage marking as shown in Table 1; See individual Section for designation.
- e. the rated voltage;
- f. the rated output in watts per unit length or area and the specified temperature for that output for those heating devices that vary their power output with temperature; and
- g. the maximum permissible steady-state current.

7. (CSA 130-03, Sec. 5.3.2) Connections and Termination Components - The cartons or containers and the instructions of all connection and termination kits shall be clearly marked with the following information:
- a. the manufacturer's name, trademark, or other recognized symbol of identification;
  - b. the catalogue number, reference number, or model;
  - c. intended use (i.e., FOR USE WITH \_\_\_\_\_ (Manufacturer) \_\_\_\_\_ MODEL (type, series, or designation) HEATING CABLE/SURFACE HEATING DEVICE ONLY);
  - d. the words "SEE INSTALLATION INSTRUCTIONS" and any applicable notices, warnings, or directions to the user;
  - e. the maximum permissible steady-state current;
  - f. the rated voltage;
  - g. the warning "CAUTION: For Industrial use only" and "ATTENTION : pour usage industriel seulement" on series cable connection kits only;
  - h. maximum temperature continuous exposure; and
  - i.  when required by Clause 4.6.1, the words "Temperature at the point of connection to branch circuit conductors may exceed 60 °C".  
 (NEC - NFPA 70)
8. (NEC, Sec. 427.20) Marking. Each factory-assembled heating unit shall be legibly marked within 75 mm (3 in.) of each end of the non-heating leads with the permanent identification symbol, catalog number, and ratings in volts and watts or in volts and amperes.