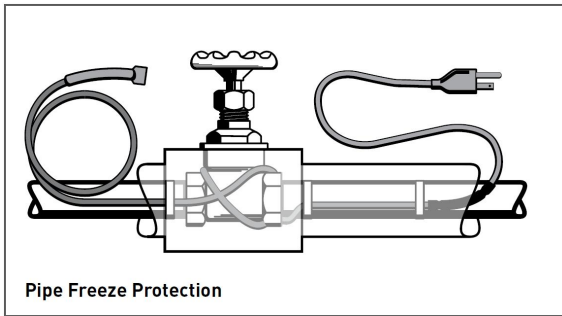


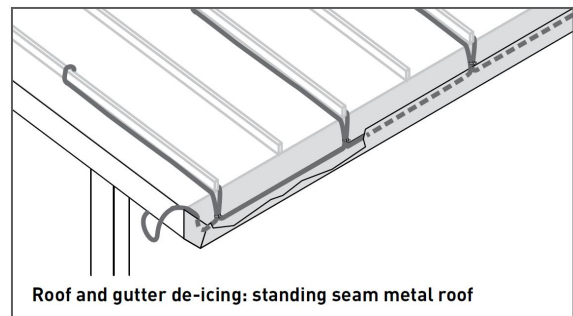
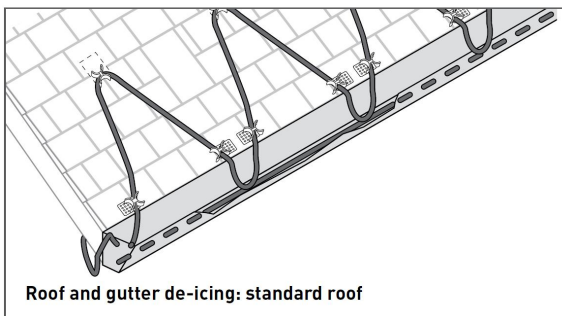
**Description**



The LTV pre-assembled self-regulating heating cables are designed for residential and commercial metal and plastic pipe freeze protection and roof and gutter deicing applications.

The LTV pre-assembled cables are available in 1-100 feet lengths for 3LTV and 5LTV, in 1-50 feet length for 8LTV, 10LTV and 12LTV, each comes assembled with a power cord with or without a plug.

The LTV pre-assembled cables more than 100/50 feet lengths are available comes assembled with a power cord for terminating in a listed standard junction box.



**Specifications**

Area classification	3LTV, 5 LTV, 8 LTV, 10 LTV, 12 LTV: all can use for pipe tracing 5 LTV, 8 LTV: roof and gutter de-icing
Supply voltage	120V 240V
Maximum maintain or continuous exposure temperature (power on/off)	65°C
Maximum intermittent exposure temperature (power on/off)	85°C Maximum cumulative exposure 1000 hours
Minimum installation temperature	-20°C
Minimum bend radius	at 20°C: 15mm at -20°C: 35mm
Product	LTV
Thickness (mm)	6
Width (mm)	13

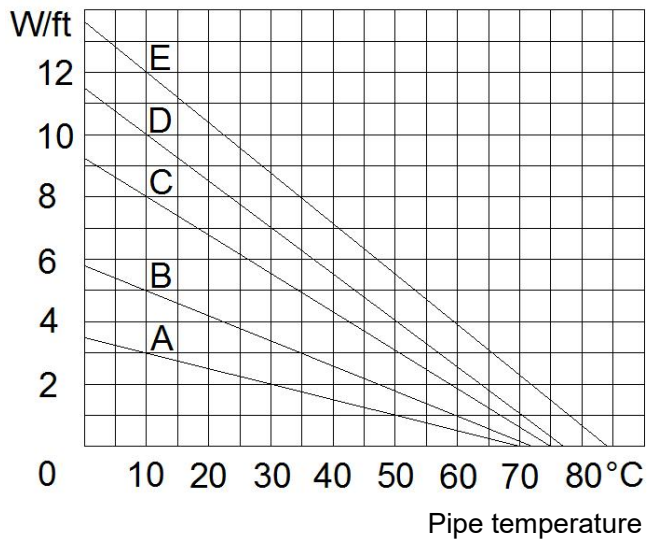
**Ground-fault protection**

To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with the requirements of Xuhui, agency certifications, and national electrical codes, 30-mA equipment or 5-mA personnel ground-fault protection must be used on each LTV heating cable branch circuit. Arcing may not be stopped by conventional circuit protection.

**Thermal output rating**

Nominal power output at 120Vac (LTV1) and 240Vac (LTV2)		W/ft @ 10°C
insulated on steel pipes		
A	3LTV1, 3LTV2	3
B	5LTV1, 5LTV2	5
C	8LTV1, 8LTV2	8
D	10LTV1, 10LTV2	10
E	12LTV1, 12LTV2	12

Heating cable sets 5LTV (8w/ft@0°C) and 8LTV (15w/ft@0°C) are covered for roof and gutter de-icing.



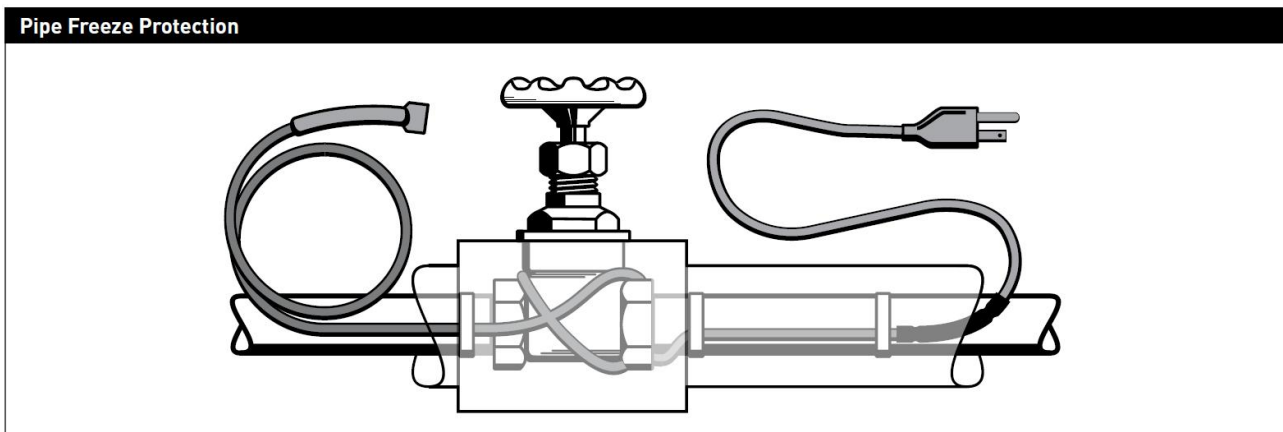
**Maximum circuit lengths (ft) based on circuit breaker sizes**

Products	Ambient temperature at start-up	Maximum circuit length (in feet) per circuit breaker					
		120V			240V		
		15A	20A	25A	15A	20A	25A
<b>LTV with 16awg conductors</b>							
3LTV	50°F (10°C)	330	330	330	660	660	660
	0°F (-20°C)	200	250	300	400	500	600
5LTV	50°F (10°C)	230	270	270	460	540	540
	0°F (-20°C)	140	190	240	280	380	480
8LTV	50°F (10°C)	150	180	200	300	360	400
	0°F (-20°C)	100	130	160	200	260	320
10LTV	50°F (10°C)	120	140	160	240	280	320
	0°F (-20°C)	80	110	140	160	220	280
12LTV	50°F (10°C)	100	120	140	200	240	280
	0°F (-20°C)	70	90	110	140	180	220
8w/ft	32°F (0°C)	100	120	140	200	240	280
15w/ft	32°F (0°C)	60	75	90	120	150	180
<b>LTV with 18awg conductors</b>							
3LTV	50°F (10°C)	250	250	250	500	500	500
	0°F (-20°C)	200	200	200	400	400	400
5LTV	50°F (10°C)	180	180	180	360	360	360
	0°F (-20°C)	140	160	160	280	320	320
8LTV	50°F (10°C)	150	150	150	300	300	300
	0°F (-20°C)	100	130	130	200	260	260
10LTV	50°F (10°C)	120	130	130	240	260	260
	0°F (-20°C)	80	110	110	160	220	220
12LTV	50°F (10°C)	100	110	110	200	220	220
	0°F (-20°C)	70	90	90	140	180	180
8w/ft	32°F (0°C)	100	120	120	200	240	240
15w/ft	32°F (0°C)	60	75	90	120	150	180

**⚠ Warning**

**Fire and Shock Hazard.** This product is an electrical device that must be installed correctly to ensure proper operation and to prevent shock or fire. Read these important warnings and carefully follow all the installation instructions.

- When used with non-metallic conduit/pipe, the vicat softening temperature of the non-metallic conduit/pipe shall be greater than 85C.
- To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with the requirements of Xuhui agency certifications, and national electrical codes, ground fault equipment protection must be used on each heating cable branch circuit. Arcing may not be stopped by conventional circuit protection.
- For pipe freeze protection applications, use only fire-resistant insulation materials such as preformed foam or fiberglass.
- Do not damage the heating cable and power cord or plug. Remove any damaged cables from service immediately.
- Do not use any wire or metal clamps to attach the cable to the pipe. Use tape (1/2 inch wide to 1 inch wide) or plastic cable ties.
- Do not install the heating cable underneath any roof covering for roof and gutter de-icing.
- Leave these installation instructions with the user for future reference.

**General requirements for pipe freeze protection:**

- LTV heating cables may be used on metal and plastic water pipes but not on flexible vinyl tubing (such as garden hoses).
- LTV heating cables are not intended for use inside any pipes, for freeze protection of liquids other than water, or for use in classified hazardous locations.
- Install with a minimum of 1/2" fire-resistant, waterproof thermal insulation.
- Never use on any pipes that may exceed 150°F (65°C).
- Do not use an extension cord.

**General instructions:**

- Install only in accessible locations; do not install behind walls or where the cable would be hidden.
- Do not run the heating cable through walls, ceilings, or floors.
- Connect only to ground-fault protected outlets that have been installed in accordance with all prevailing

national and local codes and standards and are protected from rain and other water.

**Electrical codes**

Articles 422 and 427 of the National Electrical Code (NEC), and Part 1, Section 62 of the Canadian Electrical Code (CEC), govern the installation of LTV heating cable for pipe freeze protection and must be followed.

**Important:** For the Xuhui warranty to be valid, you must comply with all the requirements outlined in these guidelines.

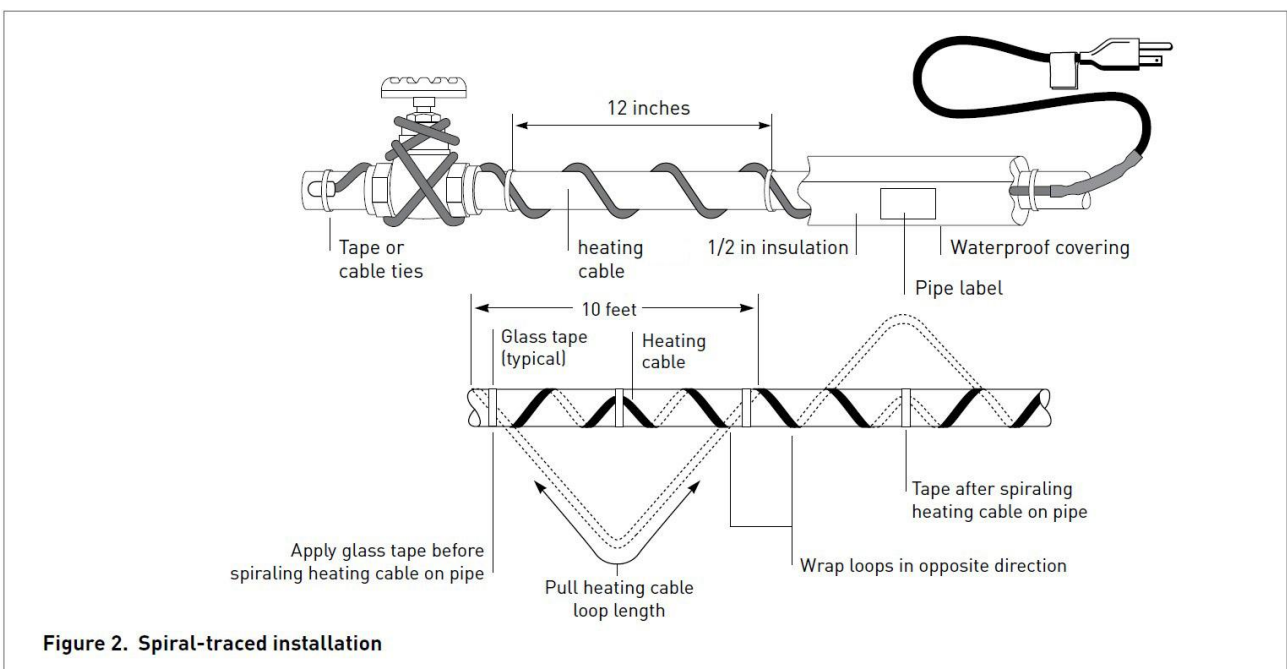
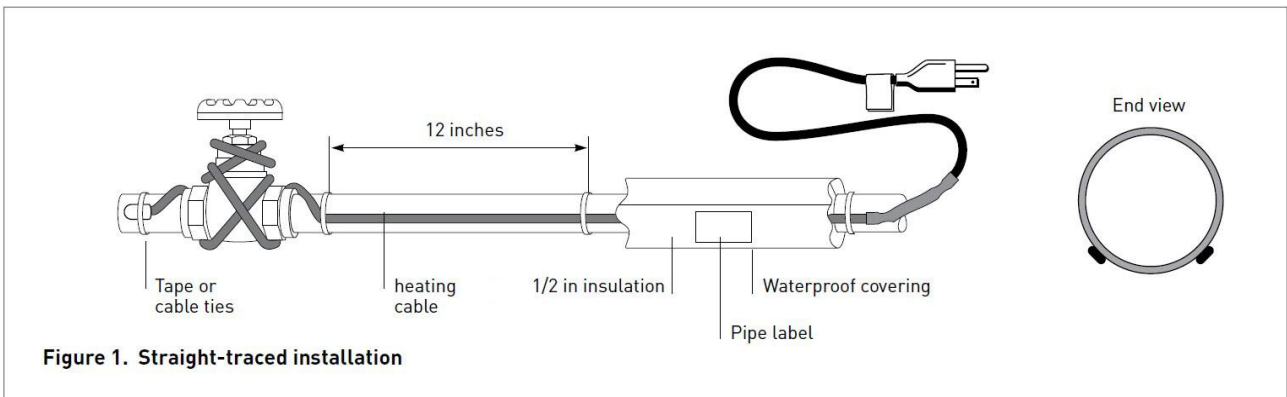
All thermal and design information provided here is based upon a “standard” installation with heating cable fastened to an insulated pipe. For any other application or method of installation, consult Xuhui at 86-553-7477605.

**Determine which LTV heating cable you need for pipe freeze protection:**

Add 1 foot to your pipe length for each valve or spigot on your pipe system.

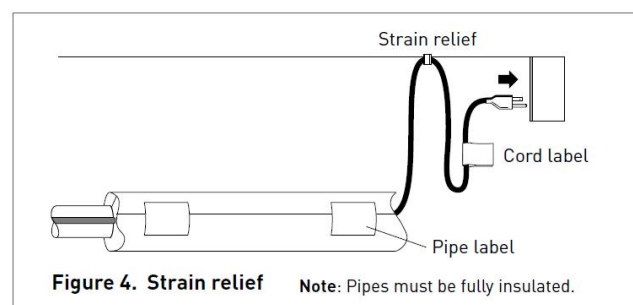
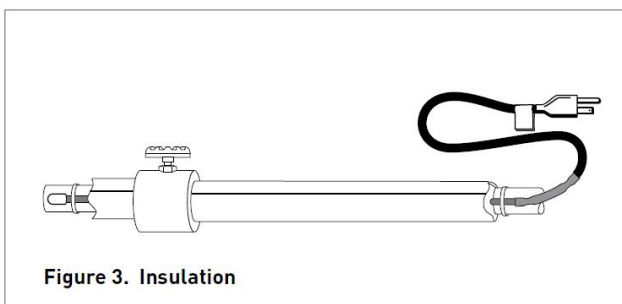
The lowest outside temperature is 0°F (-18°C), need a minimum of 1/2” thick waterproof, fire-resistant thermal insulation (preformed foam). For protection to -20°F (-29°C), use 1” thick insulation.

**Important:** All thermal and design information provided here is based upon a “standard installation”: heating cable fastened to a pipe and thermally insulated. For any other method of installation or application, consult Xuhui at 86-553-7477605.



### Heating cable installation

1. Prepare for installation.
  - Store the heating cable in a clean, dry place.
  - Complete piping pressure test.
  - Prior to installing the cable, remove any sharp surfaces on the pipe that might damage the heating cable.
  - Review the LTV heating cable design and compare to materials received to verify that you have the proper LTV heating cable.
  - Walk the system and plan the routing of the LTV heating cable on the pipe.
2. Position and attach heating cable to pipe.
  - Be sure all piping to be traced is dry.
  - Install heating cable, using straight tracing Figure 1, or spiraling Figure 2.
  - For straight tracing, install the heating cable on a lower half of the pipe; for example, in the 4 o'clock or 8 o'clock position.
  - Be sure to install the additional heating cable required for valves, flanges, etc. as shown in Figures 1 and 2.
  - When the design calls for spiraling, begin by suspending a loop every 10 feet as shown in Figure 2. To determine the loop length, divide the LTV length by your pipe length and multiply by 10. For example, if you are using a 50 ft LTV on a 40 foot pipe, leave a 12-foot loop of heating cable at every 10-foot section of pipe. Grasp the loop in its center and wrap it around the pipe. Even out the distance between spirals by sliding the wraps along the pipe. Use glass tape to secure the center of the loop to the pipe.
  - Fasten LTV heating cable to the pipe at 1-foot intervals using fiberglass application tape or nylon cable ties. Do not use vinyl electrical tape, duct tape, metal bands, or wire.
  - If excess cable remains at the end of the pipe, double it back along the pipe.
3. Check the installation.
  - Prior to installing thermal insulation, make sure the heating cable is free of mechanical damage (from cuts, clamps, etc.) and thermal damage (from solder, overheating, etc.).



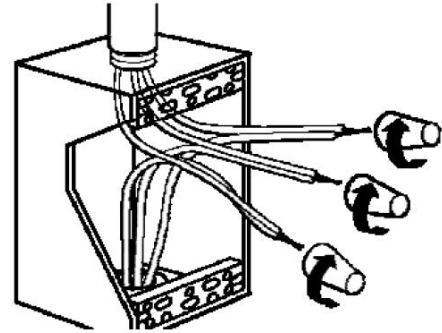
4. Install thermal insulation.
  - A reliable LTV system depends on properly installed and dry, weatherproofed thermal insulation.
  - Ensure that at least 1/2" of preformed foam or equivalent thermal insulation is used and that all piping, including valves, joints, and wall penetrations, has been fully insulated as shown in Figure 3.
  - For protection to -20°F (-29°C), use 1" thick insulation.
  - Install the insulation on the piping as soon as possible to minimize the potential for mechanical damage after installation.
  - Be sure the LTV label is visible on the outside of the thermal insulation.

#### 5. Finishing the installation.

- To prevent damage to the heating cable or cord, secure the power cord (cold lead) with a plastic cable tie, glass cloth tape, or duct tape as shown in Figure 4.
- Two labels indicating the presence of electric pipe heating cable are included with the heating cable. Attach the two “Electric Traced” labels on the outer surface of the pipe insulation at suitable intervals to indicate the presence of LTV electric heating cable.

#### 6. Starting the system.

- Xuhui recommends that the system be tested per the “Cable testing and maintenance” section below.
- Plug the heating cable into a ground-fault protected outlet.
- Check the circuit breaker to verify power to the cable.
- Standing water in the pipe should feel warm within an hour.
- For LTV with power cord but without plug, using CSA certified or UL Listed Type 4X junction box and outlet bushing and wire nuts (suitable for 12 to 18AWG wire size), connect the black and white cold leads to both phase wires and the green cold lead to ground.
- Check the circuit breaker to verify power to the cable.



**⚠ Warning: De-energize circuit before servicing.**

#### **Cable testing and maintenance**

Using a 500-Vdc megohmmeter, check the insulation resistance between both of the rectangular (power, or black and white wire) prongs on the plug and the round (ground, or green wire) prong after installing the heating cable. Minimum reading should be 50 megohms.

Record the original values for each circuit, and compare subsequent readings taken during regular maintenance schedules to the original values.

If the readings fall below 50 megohms, replace the LTV cable with a new unit. Do not attempt to repair the unit.

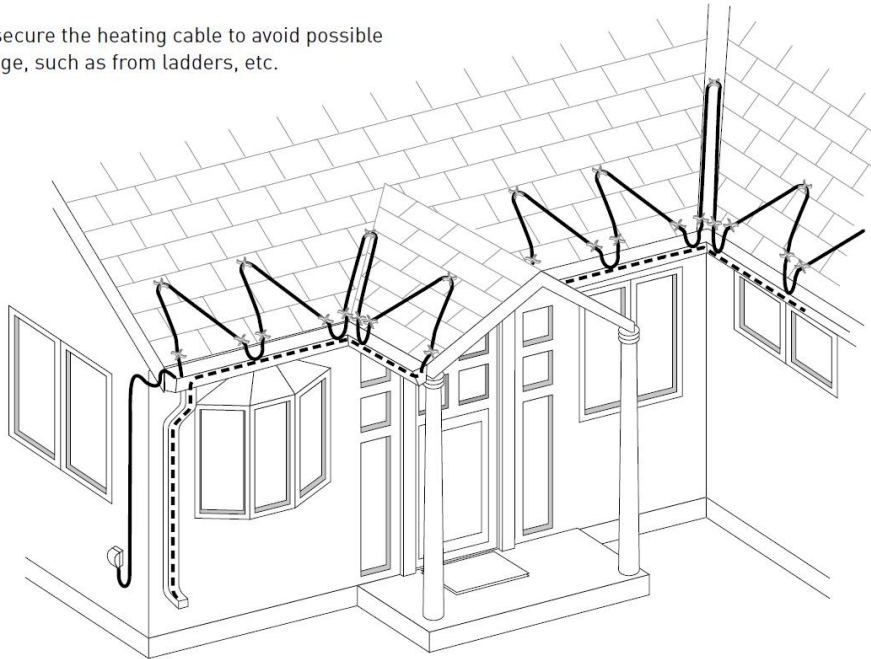
**⚠ Warning: Fire and Shock Hazard.**

**Damaged heating cable can cause electrical shock, arcing, and fire. Do not attempt to repair or energize damaged heating cable. Remove it at once and replace with a new length.**



**Roof & Gutter De-icing**

**Note:** Route and secure the heating cable to avoid possible mechanical damage, such as from ladders, etc.

**General requirements for roof & gutter de-icing:**

- When used for roof and gutter de-icing, ensure that the roofing material is suitable for the heating cable which has a maximum sheath temperature of 85C.
- LTV is designed to remove melt water, not accumulated snow.
- LTV heating cable will not keep snow or ice from falling off the roof. Snow fences or snow guards should be used to eliminate snow movement. For the names of manufacturers of snow guards or snow fences, contact Xuhui at 86-553-7477605.
- LTV heating cables may be used on:
  - Roofs made from all types of standard roofing materials, including shake, shingle, rubber, tar, wood, metal, and plastic.
  - Gutters made from standard materials, including metal and plastic.
  - Downspouts made from standard materials, including metal and plastic.
- Do not use an extension cord.
- Do not install the heating cable underneath any roof covering for roof and gutter de-icing.
- Install only in accessible locations; do not install behind walls or where the cable would be hidden.
- Do not run the heating cable through walls, ceilings, or floors.
- Connect only to ground-fault protected outlets that have been installed in accordance with all prevailing national and local codes and standards and are protected from rain and other water.

**Electrical codes**

Article 426 of the National Electrical Code (NEC), and Part 1, Section 62 of the Canadian Electrical Code (CEC), govern the installation of LTV heating cables for roof and gutter de-icing and must be followed.

**Important:** For the Xuhui warranty to be valid, you must comply with all the requirements outlined in these guidelines.

All design information provided here is based on a “standard” shake or shingle roof application. For any other application or method of installation, consult Xuhui at 86-553-7477605.

**Heating cable selection for roof & gutter de-icing**

Calculate the heating cable length.

Find the number of feet of heating cable needed per foot of roof edge in Table 3. Then, calculate the amount of total heating cable length you need using the following formula:

**Length = A + B + C + D**

A Roof edge: Roof edge (ft) x Feet of heating cable per foot of roof edge

B Roof extension: Roof edge (ft) x 0.5\*

C Roof gutter: Total gutter length (ft)

D Downspout: Total downspout length (ft) +1 (ft)

= Total heating cable length (ft)

\* Roof extension: This length allows the heating cable to extend into the gutter to provide a continuous drain path, or where no gutters are present, extends beyond the roof edge to form a drip loop.

**Example: (shingle roof)**

Eave overhang: 1 ft / 12 in

Roof edge: 15 ft

Roof gutter: 15 ft

Downspout: 15 ft

**LTV heating cable required:**

**A** Roof edge: 15 ft x 2.8 = 42.0 ft

**B** Roof extension: 15 ft x 0.5 = 7.5 ft

**C** Roof gutter: 15 ft = 15.0 ft

**D** Downspout: 15 ft + 1 ft = 16.0 ft

**Total heating required:** = 80.5 ft

**Table 3. Typical spacing and layout measurements**

Length of heating cable per foot of roof edge (feet) Standing seam metal roof:

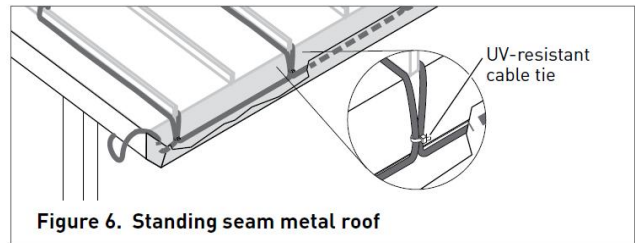
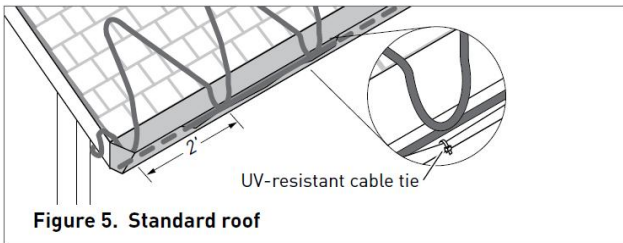
Eave overhang (in)	Shingle roof	18 in seam	24 in seam
None	2	2.5	2
12	2.8	2.8	2.4
24	3.8	3.6	2.9
36	4.8	4.3	3.6

**Note:** Xuhui recommends the use of gutters and downspouts to provide a continuous path for melted water.

- If downspout is in the middle of the run, loop the LTV down and back up. Double the length of the downspout for determining the length of LTV to install.
- For valleys, run the heating cable two thirds of the way up and down the valley.
- For gutters 5-6 inches wide use 2 runs of heating cable.
- For gutters wider than 6 inches contact Xuhui, 86-553-7477605.



**Heating cable installation**



1. Prepare for installation.

- Store the heating cable in a clean, dry place.
- Use only the following Xuhui accessories to satisfy code and agency requirements:
  - Hanger Bracket
  - Roof Clips
- Make certain gutters and downspouts are free of leaves and other debris.
- Carefully plan the routing of the heating cable for roof and gutter de-icing.

2. Position and attach the heating cable on roofs.

- Loop the heating cable on the overhang area of the roof. This is the part that extends past the building wall. Extend the bottom of each heating cable loop over the roof edge and, using a UV-resistant cable tie, connect the bottom of each loop to the cable running in the gutter to ensure a drainage channel off the roof and into the gutter and downspout. The cable running in the gutter should remain against the bottom of the gutter as shown in Figures 5 and 6.

**Table 4. Tracing heights for different roof styles**

Shake and Shingle Roof

Roof of overhang (in)	Tracing width (in)	Tracing heights (in)	Feet of LTV per foot of roof edge
None*	2	18	2
12	2	18	2.8
24	2	30	3.8
36	2	42	4.8

Standing Seam Metal Roof\*\*

Eave overhang (in)	Standing Seam Spacing (in)	Tracing heights (in)	Feet of LTV per foot of roof edge
None*	18	18	2.5
12	18	24	2.8
24	18	36	3.6
36	18	48	4.3
None*	24	18	2.0
12	24	24	2.4
24	24	36	2.9
36	24	48	3.6

\* Gutter required

\*\* No additional heating cable is required for gutters when tracing standing seam metal roofs

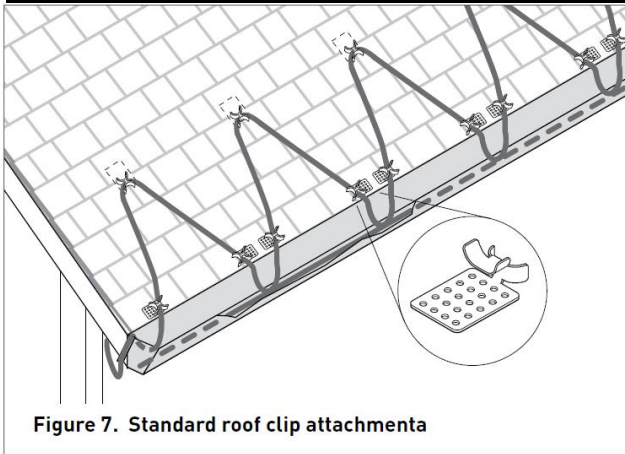


Figure 7. Standard roof clip attachment

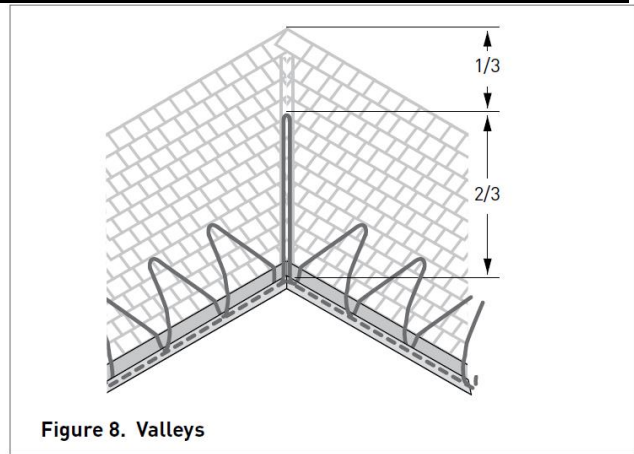


Figure 8. Valleys

- Extend the top of each heating cable loop beyond where the wall joins the roof.
- Trace two-thirds of the way up each valley with a double run of heating cable as shown in Figure 8.
- Use roof clips to route heating cable into and out of the gutter in such a way as to prevent abrasion to the cable. Protect all cable that protrudes past the lower opening of the downspout.

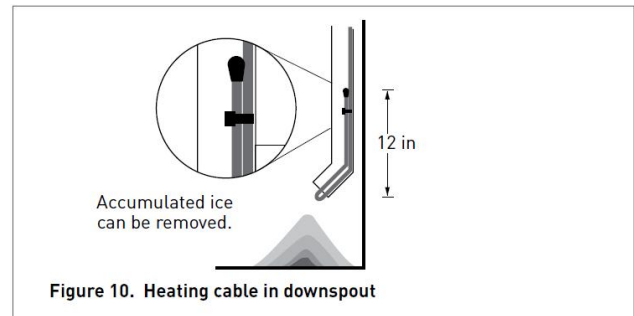


Figure 10. Heating cable in downspout

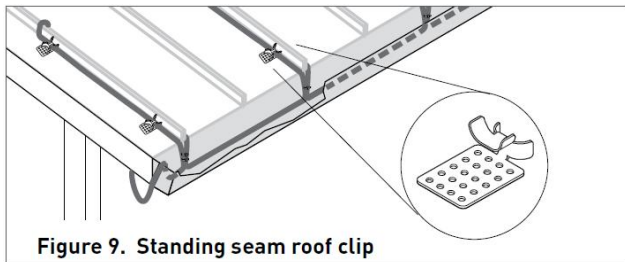


Figure 9. Standing seam roof clip

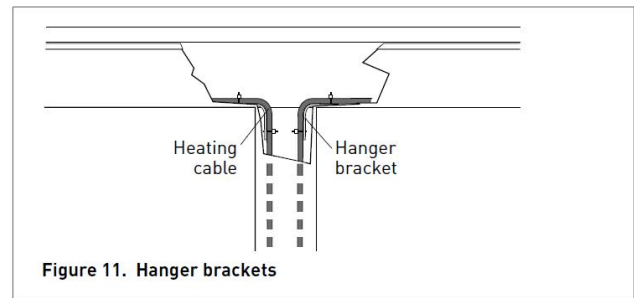


Figure 11. Hanger brackets

- Ten roof clips for approximately 7 linear feet of roof edge. 50 roof clips for approximately 35 linear feet of roof edge.
- Roof clips may be attached to a shake or shingle roof with nails or screws as shown in Figure 7. Roof clips may be attached to a metal roof using screw, nail or adhesive as shown in Figure 9. Reseal the nail or screw holes if necessary before installing heating cable in the clips.
- A barrier (snow fence) can be placed on the roof above the heating cable. This prevents damage to the cable and keeps the installation from coming loose due to ice slides. The heating cable can be attached to the barrier with UV-resistant cable ties, instead of using roof clips, if desired. Do not use wire or other materials because they may damage the heating cable.

**In gutters and downspouts**

- Run heating cable along gutters and into downspouts, ending below the freezing level. Permanent attachment of the cable to the gutter bottom is not necessary. Loop the heating cable in downspouts. Do not leave the end of the LTV in air at the end of the downspout as shown in Figure 10.
- Use Hanger Brackets at the gutter/downspout transition to protect the heating cable from fraying and from damage from sharp edges and to provide strain relief as shown in Figure 11.
- Route and secure cable to avoid possible mechanical damage, such as from ladders, etc.

### 3. Mark the installation.

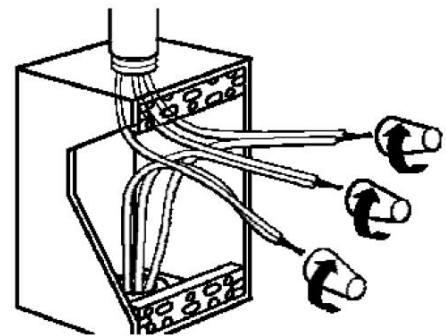
Two labels indicating the presence of electric de-icing and snow-melting equipment on the premises are included with the heating cable. One label must be posted at the electrical outlet cover. The other label must be posted at the fuse or circuit breaker panel. The labels must be clearly visible.

### 4. Check the installation.

- Prior to plugging in, check to be sure the heating cable is free of mechanical damage (cuts, clamps, etc.).
- Using a megohmmeter, test each circuit according to the instructions in the “Heating cable testing and maintenance” section on next page.

### 5. Starting the system.

- Xuhui recommends that the system be tested per the “Cable testing and maintenance” section below.
- Plug the heating cable into a ground-fault protected outlet.
- For LTV with power cord but without plug, using CSA certified or UL Listed Type 4X junction box and outlet bushing and wire nuts (suitable for 12 to 18AWG wire size), connect the black and white cold leads to both phase wires and the green cold lead to ground.
- Check the circuit breaker to verify power to the cable.



**⚠ Warning: De-energize circuit before servicing.**

### Heating cable testing and maintenance

Make sure that gutter and downspouts are free of leaves and other debris prior to the winter season.

Using a 500-Vdc megohmmeter, check the insulation resistance between both of the rectangular (power, or black and white wire) prongs on the plug and the round (ground, or green wire) prong after installing the heating cable. Minimum reading should be 50 megohms.

Record the original values for each circuit. Take additional readings during regularly scheduled maintenance and compare to the original value. If the readings fall below 50 megohms, inspect heating cables and insulation for signs of damage.

**⚠ Warning: Fire and Shock Hazard.**

**Damaged heating cable can cause electrical shock, arcing, and fire. Do not attempt to repair or energize damaged heating cable. Remove it at once and replace with a new length.**