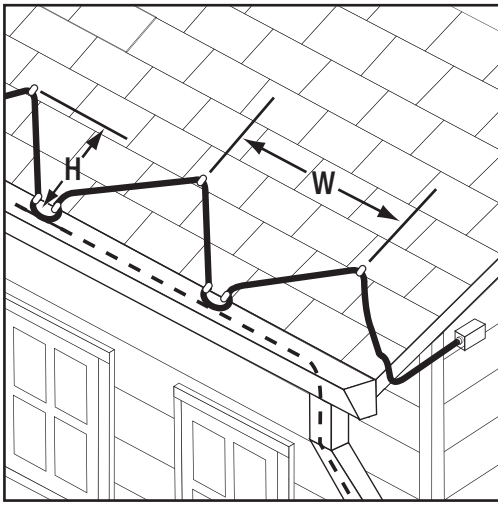


Roof And Gutter De-Icing Design Guide



Cable Length Calculations

Sloped, Standard, Non-Standing-Seam Roof



Determine the amount of cable required using the following calculation:

$$\text{Total Length} = A + B + C$$

A = Roof Edge Length. Determine roof edge length by multiplying the length of the roof edge by the spacing factor found in Table 1. The roof overhang determines the spacing.

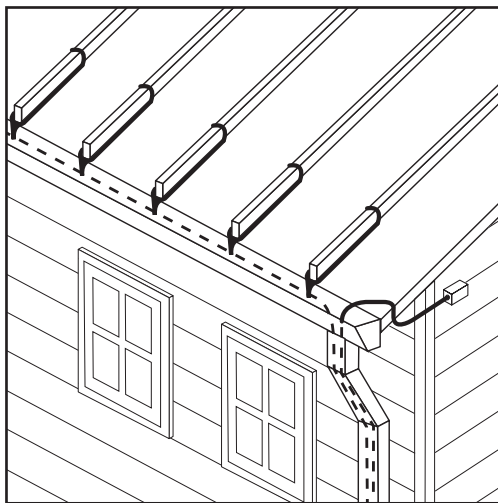
B = Gutter Length

C = Downspout Length. The downspout length is two times (2X) the downspout height because the cable will trace down and loop back up the downspout.

Table 1

Roof Overhang	Heating Width (W)	Heating Height (H)	Spacing Factor
12 in.	2 ft	18 in.	2
24 in.	2 ft	30 in.	3
36 in.	2 ft	42 in.	4

Sloped, Standard, Standing-Seam Roof



Determine the amount of cable required using the following calculation:

$$\text{Total Length} = A + B + C$$

A = Roof Edge Length. Determine roof edge length by multiplying two times the number of seams by the tracing height found in Table 2 (2X number of seams to be traced X tracing height). The roof overhang and seam spacing determine the tracing height. If the seams are less than 24 inches apart, trace every other seam.

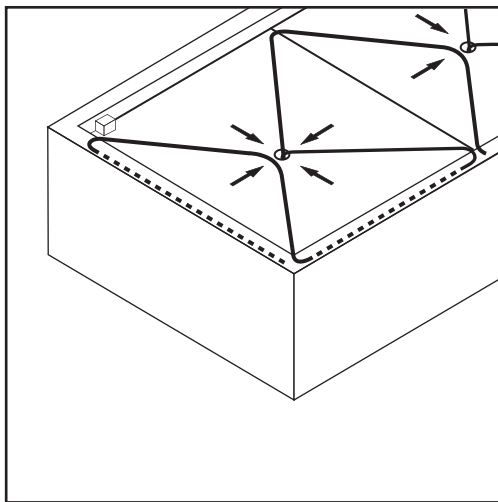
B = Gutter Length

C = Downspout Length. The downspout length is two times (2X) the downspout height because the cable will trace down and loop back up the downspout.

Table 2

Roof Overhang	Seam Spacing		Tracing Height
12 in.	18 in.	24 in.	24 in.
24 in.	18 in.	24 in.	36 in.
36 in.	18 in.	24 in.	48 in.

Flat Roofs



Determine the amount of cable required using the following calculation:

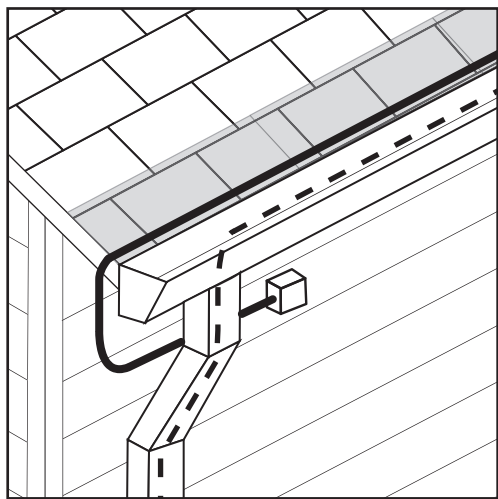
$$\text{Total Length} = A + B + C + D$$

A = Roof Perimeter

B = Sum of the Valley Lengths

C = Number of Drains X 1 foot

Edge-Cutter



Determine the amount of cable required using the following calculation:

$$\text{Total Length} = A + B + C$$

A = Roof Edge Length

B = Gutter Length

C = Downspout length. The downspout length is two times (2X) the downspout height because the cable will trace down and loop back up the downspout.

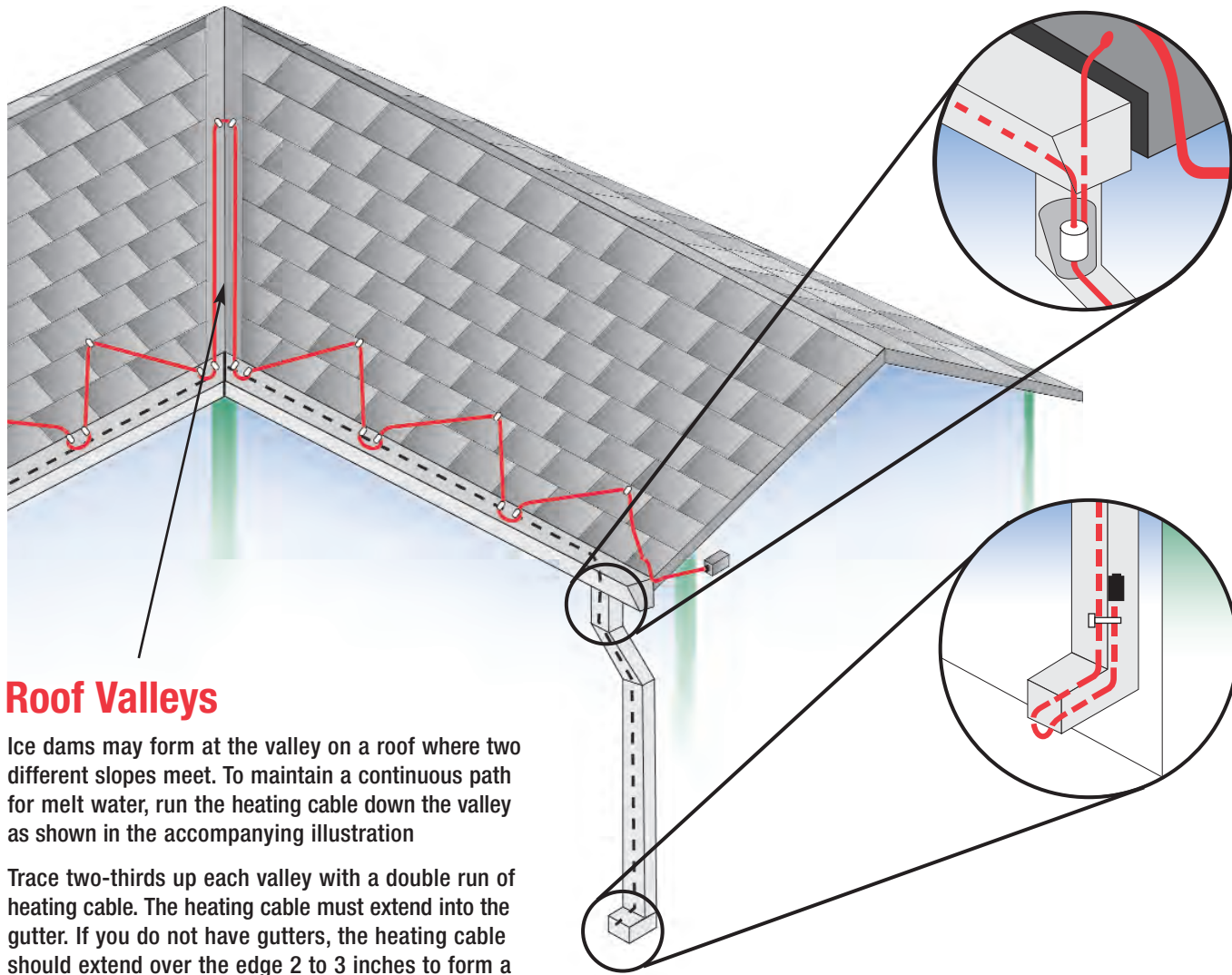
Maximum Circuit Length for Roof and Gutter Cable

To calculate the number of circuits required, divide the total lengths of cable required by the maximum heater length allowed for the breaker rating. Consult Table 3.

Table 3

Start Up	120 Vac			208-277 Vac		
	15A	20A	30A	15A	20A	30A
40°F	158 ft	230 ft	270 ft	375 ft	450 ft	540 ft
0°F	135 ft	180 ft	270 ft	270 ft	360 ft	540 ft

Cable & Clips Roof De-Icing System



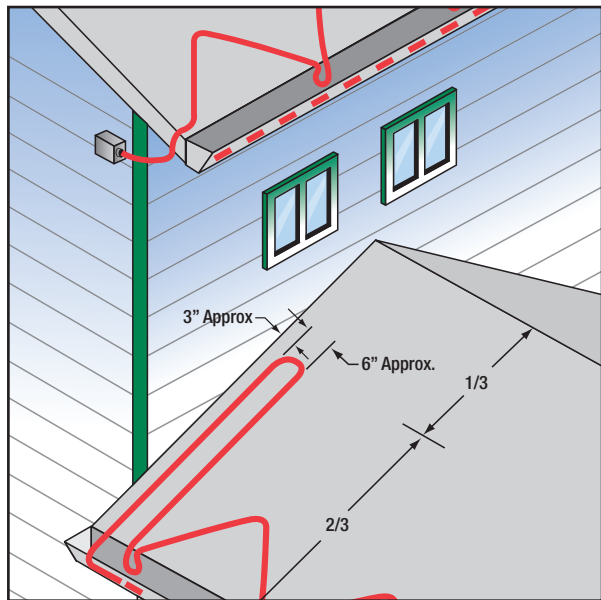
Roof Valleys

Ice dams may form at the valley on a roof where two different slopes meet. To maintain a continuous path for melt water, run the heating cable down the valley as shown in the accompanying illustration

Trace two-thirds up each valley with a double run of heating cable. The heating cable must extend into the gutter. If you do not have gutters, the heating cable should extend over the edge 2 to 3 inches to form a drip loop.

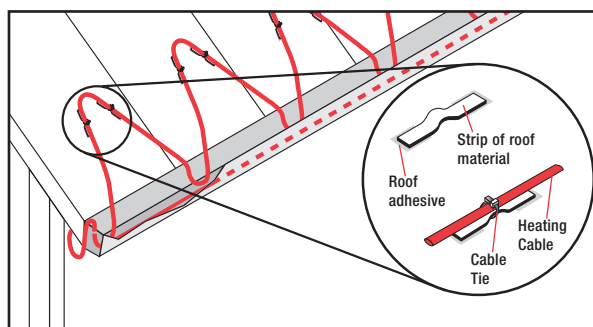
Roof Intersection

Extend a loop of heating cable two-thirds of the way up the slope to the adjacent wall. Position the closest heating cable approximately 3 inches on the wall. Position the second heating cable 6 inches from the first.



Attachment Methods

Sloped, Shingle Roof



Create attachment strips using the same material as that of the roof. Apply the strips to the roof underneath the cable run using the appropriate means for the roof material (i.e., tar for shingles, solder for copper, adhesive for membrane sheet). Allow a small loop in the middle of the strips through which UV-resistant cable ties are inserted to secure the heating cable.

Alternative Attachment Method

The heating cable may also be attached with UV-resistant cable ties to a bracket, rod, or cable used to support the heating cable and then attached to the roof in such a way as to support the weight of the heating cable.

Gutters

Ice may accumulate in gutters and on the roof edge. To maintain a continuous path for melt water to run off, route the heating cable as follows:

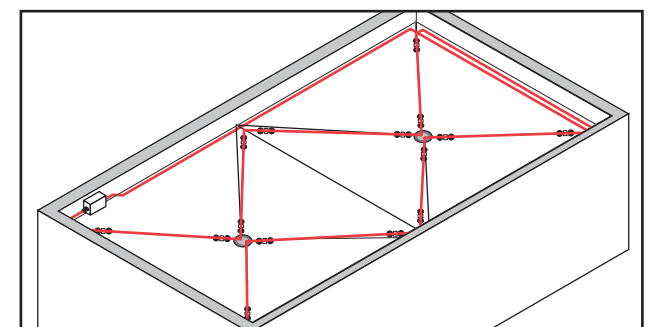
1. In standard gutters up to 6 inches wide, use one run of heating cable. In gutters 6 to 12 inches wide, use two parallel runs of heating cable.
2. Continue heating cable down inside the downspout.
3. Standard attachment method is AT-1 aluminum tape. However, mechanical attachment may not be necessary.

Downspouts

Ice may form in downspouts and prevent melt water from escaping from the roof. To maintain a continuous path for melt water runoff, run the heating cable inside the downspout hanger, as shown here.

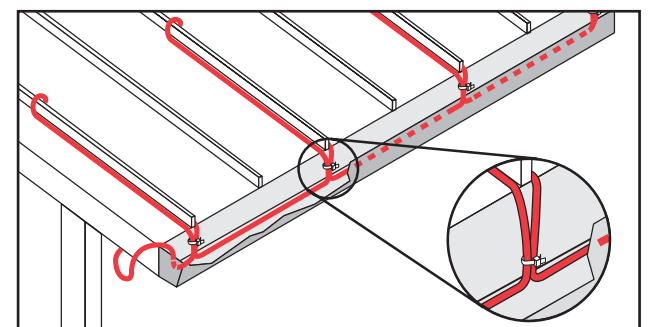
If the downspout ends underground, extend the heating cable into a heated area or below the frost line. Leave drip loops below the downspout at the bottom. If the downspout ends near the ground, water will refreeze on the ground and build up around the downspout, eventually blocking the opening. Do not leave the end seal exposed at the end of the downspout.

Membrane Roof



Create attachment strips using the same material as that of the roof. Apply the strips to the roof underneath the cable run using the appropriate adhesive for the membrane sheet. Allow a small loop in the middle of the strips through which UV-resistant cable ties are inserted to secure the heating cable. Use at least one attachment point for every 5 to 10 feet of unsupported heating cable and at every point where the cable changes direction.

Standing Seam Roof



Draw the heating cable together at the bottom of the cable loop in the gutter using UV-resistant cable ties.

Notes

- Do not crush, crimp, cut, or otherwise damage the heating cable. This could cause the system to fail, creating an electrical shock or fire hazard.
- Do not apply adhesives or other chemical directly to the heating cable. Many adhesives will not stick to the outer jacket. This could cause the attachment to fail, resulting in inadequate drain paths.
- Provide enough strength to support the heating cable on the roof plus any load from snow that collects on the system. If the attachment method is not strong enough, then the heating cable could come loose and fall off.

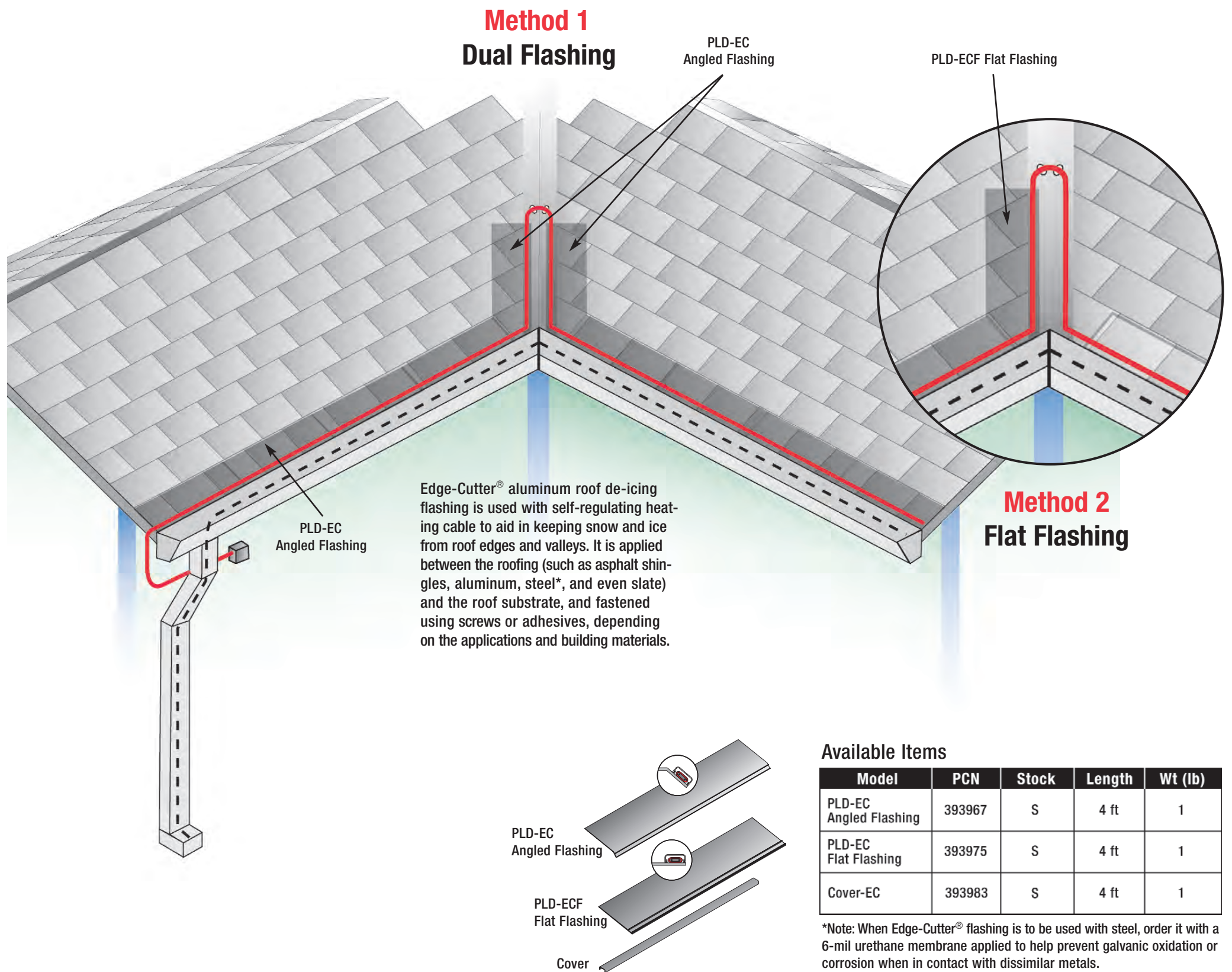
Roof & Gutter De-Icing Products & Accessories

Item	Model	Description
Self-Regulating Heating Cable	SRF5-1RG	120 V, 12 W/ft in snow and ice, 5 W/ft in free air. Tinned copper braid and UV-stabilized TPE overjacket.
Self-Regulating Heating Cable	SRF5-2RG	240 V, 12 W/ft in snow and ice, 5 W/ft in free air. Tinned copper braid and UV-stabilized TPE overjacket.
Power Connection	RG-PK-1	Power termination into junction box with one end seal and two "Warning-Electric Traced" adhesive labels.
Junction Box	PJB-RG	Liquid-tight NEMA 4X junction box with two (1/2 in. NPT) conduit hubs.
Splice Kit	RG-SK-1	Materials for one splice connection.
End Seal Kit	RG-EK-1	Materials for one end connection.
Roof Clip	RCK-1	Cable clips for attaching cable to roofing material. Ten per kit.
Downspout Hangers	RDK-1	Hangers to support cable in gutter and downspout. One per pack.
Aluminum Tape	AT-1	Hangers to support cable in gutter and downspout. One per pack.

Roof and Gutter De-Icing Quick Install Guide

Quick Install Guide is a specification tool only. Always refer to proper installation instructions when installing heat trace cable.

Edge-Cutter® Roof De-Icing System



Available Items

Model	PCN	Stock	Length	Wt (lb)
PLD-EC Angled Flashing	393967	S	4 ft	1
PLD-EC Flat Flashing	393975	S	4 ft	1
Cover-EC	393983	S	4 ft	1

*Note: When Edge-Cutter® flashing is to be used with steel, order it with a 6-mil urethane membrane applied to help prevent galvanic oxidation or corrosion when in contact with dissimilar metals.

Controls



GIT-4 Controller with GFI Protection

- Minimum operating costs
- Maintains ice melting heater efficiency
- Built-in ground fault equipment protection (GFEP) for safety
- UL and CUL Listed to Standard 873
- Remote monitor and control included
- Low cost
- Simple installation



weatherTRACE™ Freeze Protection Heat Trace Panels

- For large centralized system with monitoring capabilities
- Standard NEMA 4 enclosures
- NEMA 4x stainless steel enclosure option
- 12, 18, 20, 30, and 42 position panelboards
- 15, 25, 30, and 40 amp single-pole and double-pole 30 mA ground fault thermal magnetic circuit breakers
- 100 and 225 amp main bus
- Single-phase 120/240 Vac
- Three-phase 120/208 Vac 4-wire
- Three-phase 277 Vac 4-wire



APS-4C and SC-40C with CIT-1 and GIT-1 for Large Distributed Systems

- Controls mechanically-held contactors
- Remote control/monitor (available option)
- NEMA 3R enclosure
- UL Listed
- Adjustable heater on-hold timer
- Heater cycle push button
- Multiple sensor capability

Important Safeguards

- Inspect all insulation and weather proofing.
- Inspect all junction box, connection box and sensor connections.
- Verify all circuits have been properly grounded.
- Verify all circuits are connected in proper panel locations.
- Verify proper circuit breakers are in place (always use 30 mA trip GFI type breakers).
- Verify all circuit lengths are within manufacturer's specified limits.
- Verify all proper safety warnings are in place.

Tools Needed

- Wire cutters/strippers
- Megger
- Phillips head screwdriver
- Voltmeter
- Standard screwdriver
- Utility knife

Electrical Tests

- Continuity test
- Circuit voltage
- Initial current
 - Note ambient temperature
- Stabilized current (after 15 minutes operation)
 - Note ambient temperature
- Always use grounded fault circuit breakers
30 mA trip level

Installation Tips

- Ensure surface is clear of leaves and other debris before installing heat trace.
- Do not twist bus wires together at end of circuit.
- Seal all electrical connections against moisture.
- Seal ends of exposed cable during installation.
- Do not expose cables to temperatures above their maximum ratings.

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