

# Freeze Protection Planning Guide and Inventory Checklist



# Freeze Protection Planning Guide and Inventory Checklist

## Introduction

Anticipating freezing conditions and protecting buildings, equipment, and grounds against freeze damage is a vital part of a Facility Maintenance Program. A good freeze protection plan includes steps for inspection, preventative maintenance, and corrective maintenance prior to the beginning of cold weather conditions. We designed this guide to make the planning process easier for you. Contact your local distributor at 1-877-298-2258

## Table of Contents

Introduction.....	2
Section A: General Freeze Protection Preparation Steps.....	3
Section B: Testing and Periodic Inspection Record for Heating Cable .....	6
Periodic Heating Cable Inspection Record .....	6
Heating Cable Insulation Resistance Test.....	7
Section C: Inventory Checklist for Pipe Lines and Valves That Need Heat.....	8
Section D: Inventory Checklist for Containers Stored in Unheated Areas or Susceptible to Freezing.....	9
Drums / Pails.....	9
Intermediate Bulk Containers (IBC) / Tote Tanks.....	10
Gas Cylinders .....	10
Section E: Inventory Checklist for Large Permanent Tanks, Vessels, and Hoppers in Unheated Areas or Susceptible to Freezing.....	11
Section F: Inventory Checklist for Roof and Gutter Deicing .....	12
Roofs that Need Heat.....	<b>Error! Bookmark not defined.</b>
Downspouts that Need Heat.....	<b>Error! Bookmark not defined.</b>
Section G: Inventory Checklist for Personal Safety / Slip Prevention.....	13
Walkways Susceptible to Icy Conditions .....	13
Stairs Susceptible to Icy Conditions.....	14
Section H: Inventory Checklist for Damaged Heaters That Need to Be Replaced.....	15
Section I: Inventory Checklist for Temporary De-icing Heaters .....	16
HSTAT Heating Tapes with Adjustable Thermostat Control Order Sheet .....	16

# Freeze Protection Planning Guide and Inventory Checklist

## Section A: General Freeze Protection Preparation Steps

These are general freeze protection planning steps we found useful through research and personal maintenance experience. These steps are not all-inclusive and we recommend that you consult a trained professional and review your corporate policies and local /national codes prior to implementing your plan.

	Item	Assigned to	Date Complete	Sign-off
<input type="checkbox"/>	Clean, service, and functionally test all heating systems.			
<input type="checkbox"/>	Roof and gutter: Inspect, remove debris, and patch/repair (if needed): roof drains, scuppers, canals, gutters, down spouts before first frost. Inspect and functionally test installed roof and gutter heat trace system.			
<input type="checkbox"/>	Identify and test main water supply cutoffs for each facility. Ensure these areas are readily available to emergency personnel responding to a freeze/thaw incident.			
<input type="checkbox"/>	Inspect wet-pipe sprinkler systems for areas susceptible to freezing. Apply heat in susceptible areas.			
<input type="checkbox"/>	<p>Identify materials that are susceptible to freeze damage in outside storage pads and unheated storage areas. Develop plan to ensure these materials can be easily heated and thawed to maintain production.</p> <p><i>Tip: Think about materials that might be delivered during the cold season in unheated vehicles. BriskHeat offers plug-and-play portable heaters that easily wrap around and heat drums, pails, and tanks to thaw frozen or slow flowing materials.</i></p>			
<input type="checkbox"/>	Check and place antifreeze used in cooling systems as necessary.			
<input type="checkbox"/>	Protect heating system power and temperature controls against inadvertent deactivation.			

## Freeze Protection Planning Guide and Inventory Checklist

	Item	Assigned to	Date Complete	Sign-off
<input type="checkbox"/>	Drain and remove water from all seasonal cooling systems (unless protected by heating tapes or antifreeze).			
<input type="checkbox"/>	Inspect, test, and stage portable auxiliary heaters.			
<input type="checkbox"/>	<p>Inspect conditions of all surface heaters such as heating tapes, heating cable, drum heaters, IBC heaters, tank heaters, and pipe heaters. Verify operation and temperature settings and test ground-fault equipment protection.</p> <p><i>Tip: Look for damaged insulation on all exposed portions of the power cord. If possible, check both ends of the cord for loose connections. An exposed conductor may come in contact with personnel during maintenance activities resulting in sparks or injury.</i></p>			
<input type="checkbox"/>	Inspect, test, and repair heat trace heating cable located on cooling tower supply and return lines.			
<input type="checkbox"/>	<p>Inspect and identify remaining water and air lines susceptible to freezing. Install appropriate heat and insulation.</p> <p><i>Tip: Pay special attention to valves. This is a major choke point and susceptible to damage. BriskHeat offers a safe and effective flexible heating tape (HSTAT series) that can be used as preventative maintenance or used to thaw out a valve quickly. See section I for more information.</i></p>			
<input type="checkbox"/>	For steam systems: Blow down drip legs, clean strainers, test temperature sensing devices for actuation of control valves and dampers, check steam traps, control actuators/valves, face and bypass dampers, linkages, and temperature controllers. Ensure that a vacuum breaker is installed and in working order on all preheat and heating coils which may be exposed to freezing conditions.			

## Freeze Protection Planning Guide and Inventory Checklist

	Item	Assigned to	Date Complete	Sign-off
<input type="checkbox"/>	For ventilation systems: Test and calibrate all temperature sensing devices, and check operation of valves, dampers, linkages, control actuators, and temperature controllers.			
<input type="checkbox"/>	Identify areas where personal safety is at risk due to icy conditions. Develop a slip prevention maintenance plan. See section G for ideas.			
<input type="checkbox"/>	Identify control panels and electronic devices susceptible to condensation. Install enclosure heaters to prevent short-outs and corrosion.			
<input type="checkbox"/>	Institute a facility-wide awareness plan to identify and report any suspected problems with heating or other cold weather protection equipment during the cold season.			
<input type="checkbox"/>	Have plan in place to remove temporary cold weather protection items after the cold weather season.			

### Special Consideration: Hazardous Materials

- Ensure that all containers used for hazardous or toxic materials are properly stored, and inspect them for deterioration prior to handling. If containers become brittle (due to the combination of chemical attack, freezing temperatures, and ultraviolet light) they may break when moved.
- Liquids should not be permitted to remain in unheated process lines during periods when production has been stopped. All lines should be drained and purged to prevent future line breakage due to freezing temperatures.
- Ensure that piping, tanks, and valves in systems that carry hazardous or toxic substances are properly insulated and/ or heated. Install heaters such as heating blankets, insulators, heating tapes, heating jackets, and heating cable as appropriate.

# Freeze Protection Planning Guide and Inventory Checklist **Section B: Testing and Periodic Inspection Record for Heating Cable**

## Periodic Heating Cable Inspection Record

Instructions:

- 1) **One sheet per circuit.** – This inspection form allows for up to five inspections to be compared for an individual circuit.
- 2) **Maintenance Check Frequency:**  
 Freeze Protection Circuits: Prior to the first freeze  
 Temperature Maintenance Circuits: At least twice per year

Circuit Number
Heater Type
Circuit Length

		(mm/yy)	(mm/yy)	(mm/yy)	(mm/yy)	(mm/yy)
<b>Maintenance Check Date (Month/Year)</b>						
Visual inspection inside connection box corrosion, moisture, etc.	Initial					
Damage or cracks (leaks) in insulation seals at valves, hangers, pumps, etc.	Initial					
Heating cable properly connected and grounded. Heating cable and connections insulated from connection box.	Initial					
Thermostat checked for moisture, corrosion, set point, switch operation, and sensor damage.	Set Point					
	Initial					
Megger tests performed at power connection with both bus wires disconnected from power wiring.	Reading					
	Initial					
Circuit voltage at power connection.	Reading					
Circuit amperage after 5 minutes.	Reading					
Pipe temperature at time amps were measured.	Reading					
Watts/Ft. <u>Volts x Amps</u> = w/ft. feet	Watts/Ft.					
	Initial					
All connections, boxes, and thermostats have been resealed.	Initial					
End seals, covered splices and tees marked on insulation cladding.	Initial					

Periodic Inspection Record Form

Remarks & Comments					

# Freeze Protection Planning Guide and Inventory Checklist

## Heating Cable Insulation Resistance Test

The insulation resistance test is used to check for damage to extruded jackets. Connections for the megger are made as shown in *Figures 1 & 2*.

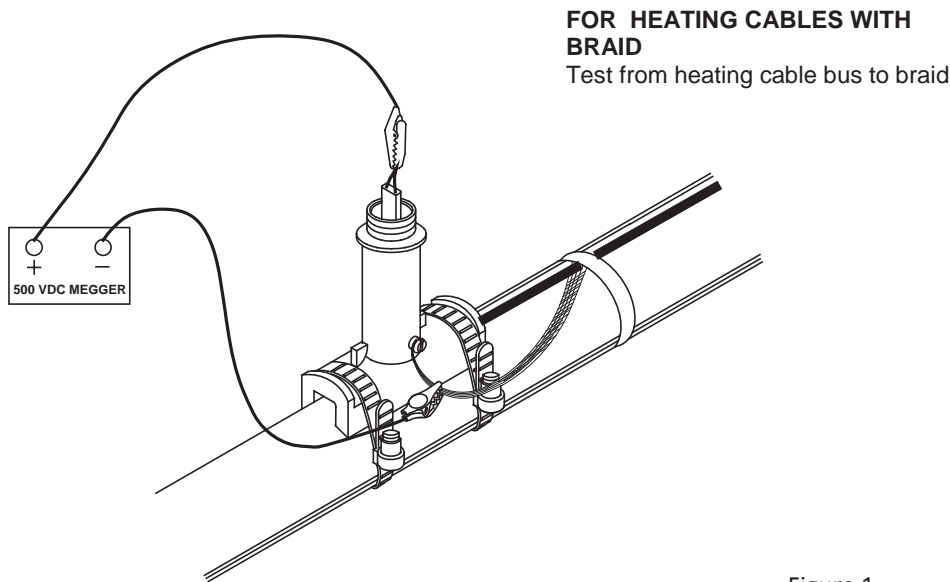


Figure 1

*Note: Test should use at least a 500 VDC megger. Do not use a megger with an excess of 2500 VDC. Minimum acceptable readings should be 20 megohms per circuit, regardless of length.*

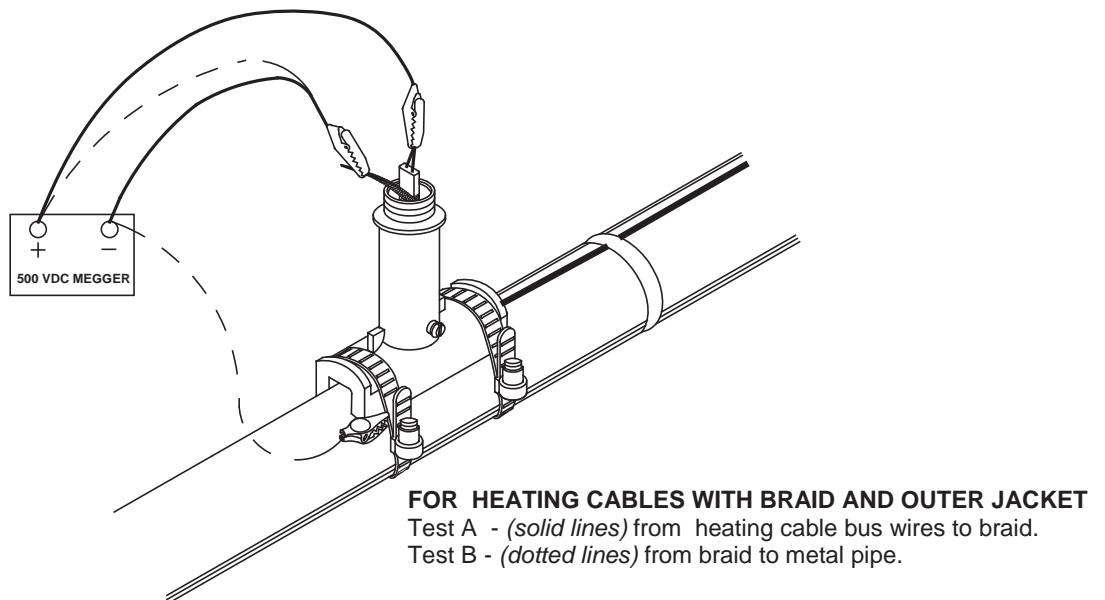


Figure 2

A record should be kept of the readings taken from the time the cable is first installed on the pipe. A history of the insulation resistance reading can be helpful in spotting moisture ingress into the electrical system by seeing a gradual decline in the insulation resistance or physical damage to the heating cable (sharp decline in the insulation resistance). See the previous page for a sample record.

# Freeze Protection Planning Guide and Inventory Checklist

## Section C: Inventory Checklist for Pipe Lines and Valves That Need Heat

Use this checklist to identify the pipe lines that need heat. Your local distributor or BriskHeat will help you determine the proper type and amount of heating cable, insulation, and accessories necessary for your application.



SLCBL: Self-Regulating Heating Cable



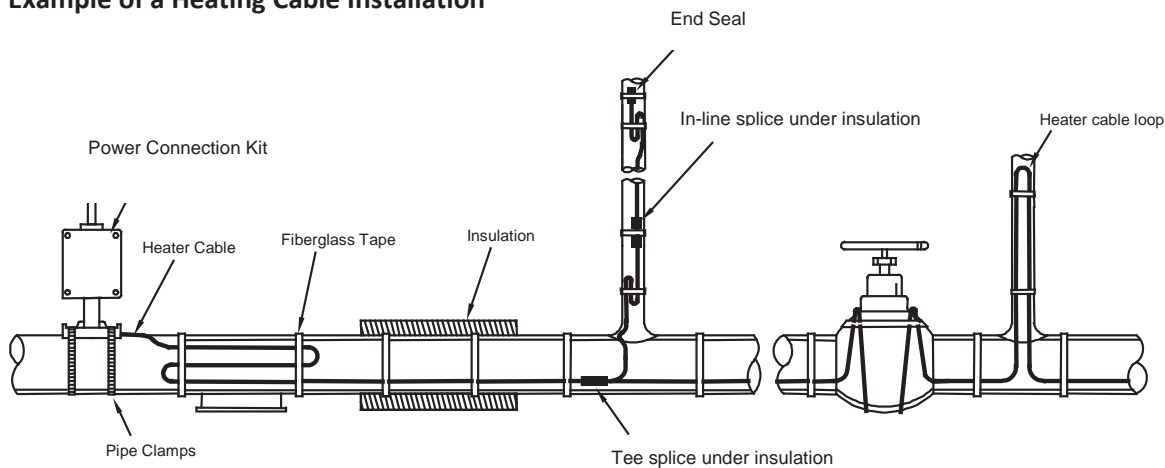
SpeedTrace: Self-Regulating Heating Cable Pre-Assembled with 30" Cord and Plug.



InsulLock®DS: Closed Cell Elastomeric Thermal Insulation

Pipe / Valve Location Where Heat is Needed	Length of Pipe / Size of Valve Where Heat is Needed	O.D. of Pipe / Valve	Temperature Required	Available Voltage Supply and Circuit Breaker Size	Hazardous Location? (Y/N) If Yes, Classification?	Insulation is Needed? (Y/N) Insulation Thickness?

### Example of a Heating Cable Installation

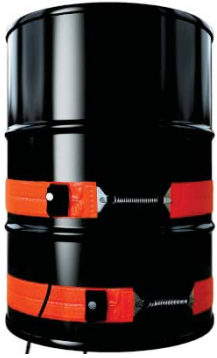




# BriskHeat® Freeze Protection Planning Guide and Inventory Checklist

## Section D: Inventory Checklist for Containers Stored in Unheated Areas or Susceptible to Freezing

Containers such as drums, pails, tote tank / IBCs, and gas cylinders contain materials that either freeze or need a specific flow rate to maximize production. Utilizing a portable plug-and-play electrical surface heater on the container prior to and during production is a cost-effective and simple way to thaw and improve the flow rate of the material within the container.



DHCS: Heavy-Duty Silicone Rubber Drum Heater



TOTE: Wrap-Around Tote Tank / IBC Heater



GCW: Gas Cylinder Warmer



FGDH: Full-Coverage Insulated Drum Heater

### Drums / Pails

Container Size (Make a special note if the container will be in a hazardous environment)	Qty of Containers that Need Heat	Container Outer Material (metal, plastic, etc.)	Available Voltage Supply for Heater (120V or 240V)
55 gallon (208 litre) drums / barrels			
30 gallon (114 litre) drums / barrels			
15 & 16 gallon (57 & 60 litre) pails			
5 gallon (19 litre) pails			

*Tip: For faster heat-up, use multiple silicone rubber band heaters at one time or a full-coverage insulated drum heater.*

#### Recommended Solutions:

- For Drums and Pails:
  - **DHCS series:** Heavy-Duty Silicone Rubber Band Heater - Great all-purpose choice: economical, moisture & chemical resistant and long lasting. Includes built-in adjustable thermostat control. 120V model includes standard 3-prong (NEMA 5-15) grounded plug.
  - **FGDH series:** Full-Coverage Insulated Drum Heater - Fully insulated and more wattage for faster and more energy-efficient heat-ups. Includes built-in digital temperature controller. 120V model includes standard 3-prong (NEMA 5-15) grounded plug.



# Freeze Protection Planning Guide and Inventory Checklist Intermediate Bulk

## Containers (IBC) / Tote Tanks

Tank Height (Not including pallet or support stand)	Tank Length	Tank Width	Qty of Tanks that Need Heat	Tank Outer Material (metal, plastic, caged, etc.)	Available Voltage Supply for Heater (120V or 240V)

### Recommended Solution:

- For Tote Tanks / IBCs:
  - **TOTE series** – Adjustable Wrap-Around Tote Tank / IBC Heater – Fully insulated blanket heater wraps around tote tank / IBC without contaminating or scorching your product. Adjustable straps allow it to fit multiple container widths. Includes dual adjustable thermostat control: 50 to 160°F (10 to 71°C).
    - 240V is recommended for fastest heat-up. It offers double the wattage (2880 watts) compared to 120V version (1440 watts).
    - Do not forget the insulated top. It minimizes heat loss and improves heater efficiency.



## Gas Cylinders

Cylinder Diameter	Cylinder Height	Qty of Cylinders that Need Heat	Hazardous Location? (Y/N) If Yes, Classification?	Available Voltage Supply for Heater (120V or 240V)

### Recommended Solutions:

- For Gas Cylinder Warmers
  - **If Ordinary Location:** GCW series- Ordinary Location Gas Cylinder Warmer – 2” (50mm) thick insulation and self-regulating heating element. No extra temperature control necessary. 120V model includes standard 3-prong (NEMA 5-15) grounded plug.
  - **If Hazardous-Area Location:** HCW series- Hazardous-Area Gas Cylinder Warmer – Same as above except it is suitable for Class I Division 1 Groups B, C, and D. No plug is included.



# Freeze Protection Planning Guide and Inventory Checklist

## Section E: Inventory Checklist for Large Permanent Tanks, Vessels, and Hoppers in Unheated Areas or Susceptible to Freezing

Use this checklist to identify the tanks, vessels, and hoppers that are susceptible to freezing. Your local distributor or BriskHeat will help recommend exactly how much heat you need to prevent freezing or improve flow as well as which style of heater, insulation, and temperature control is right for you.



<b>Vessel Location</b> (Make a special note if it is in a Hazardous Location)	<b>Vessel Type</b> (Cylindrical Tank, Rectangular Tank, Hopper, etc.)	<b>Vessel Size</b>	<b>Vessel Outer Material</b> (metal, plastic, etc.)	<b>Content Stored in Vessel</b>	<b>Process Temperature</b>	<b>Available Voltage Supply and Circuit Breaker Size</b>



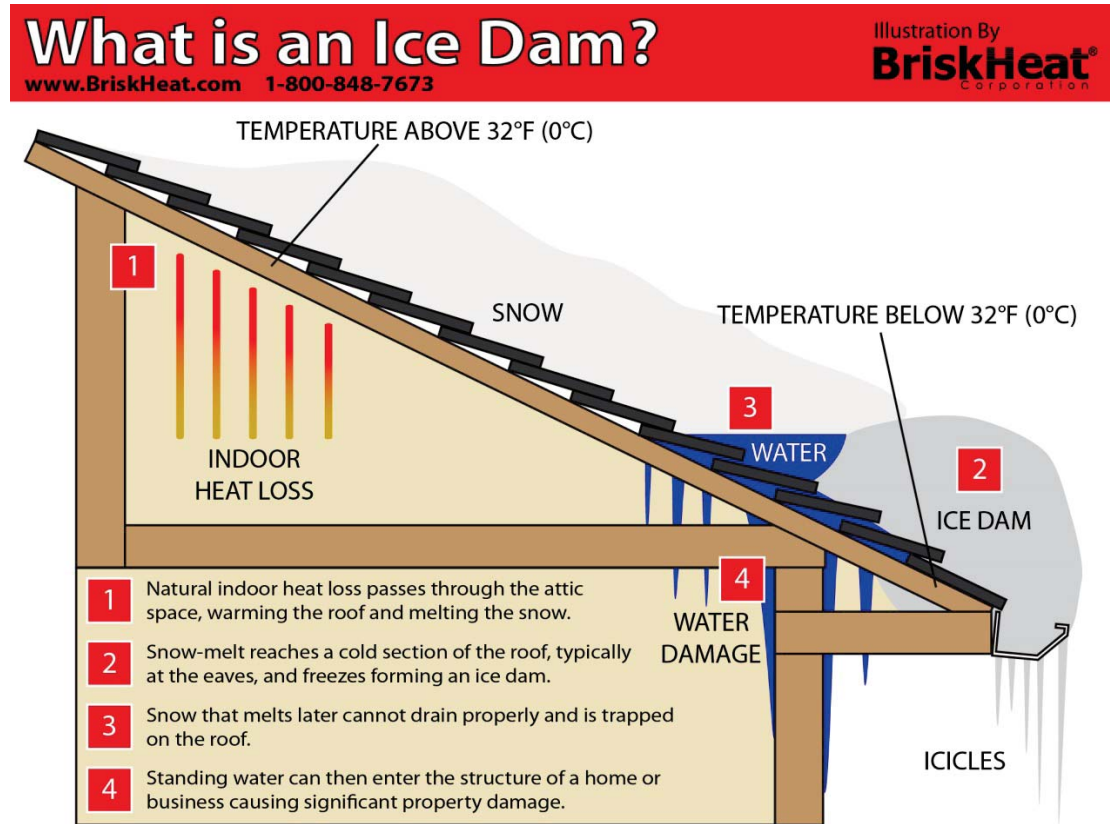
**NEW! SRL-ADJ Series: Silicone Rubber Heating Blankets with Control.**

True plug-and-play silicone rubber heating blanket with Built-in Adjustable Thermostat Control. Many sizes to choose from. See BriskHeat product catalog or visit [www.briskheat.com](http://www.briskheat.com) for additional information.

# Freeze Protection Planning Guide and Inventory Checklist

## Section F: Inventory Checklist for Roof and Gutter Deicing

When gutters and downspouts freeze, major damage can occur to your building’s roof and façade. We recommend roof and gutter self-regulating heating cable as the solution.



BriskHeat's SpeedTrace Roof & Gutter De-Icing Kits are designed to prevent the formation of ice Dams on rooftops by using an electric self-regulating heating cable system. The heating cable melts away excessive ice and snow from the roof, gutters, and downspouts to ensure proper draining.

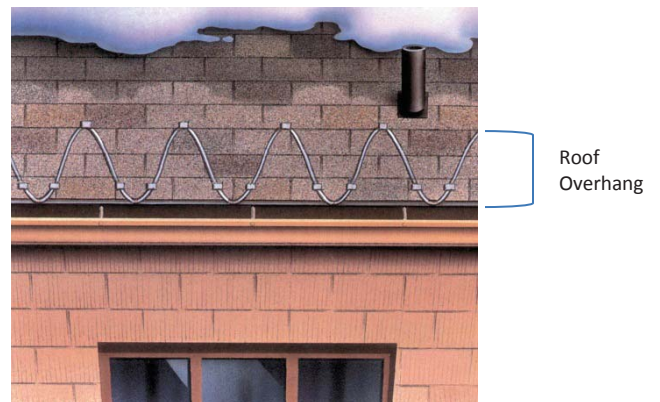
**Kits include:** SpeedTrace Roof & Gutter Heating Cable (pre-assembled with 30” cord and plug), Heavy Duty Roof Clips, Downspout Hanger Brackets, UV Resistant Cable Ties.

### Measuring Heating Cable Length for Roof & Gutter De-Icing

Use the equation below to calculate heating cable length:

- Cable Required for Roof =  $(R \times M) + G + D$
- (R) Roof Edge Length (linear length of roof to protect)
  - (M) Multiplier from table below
  - (G) Gutter Length
  - (D) Downspout Length (x2 if heating cable returns back to gutter)

Roof Overhang (Eave/Soffit)	Standard Roof	Standing Seam Roof, 18" (45cm) Seam	Standing Seam Roof, 24" (60cm) Seam
None	2.0	2.5	2.0
12" (30cm)	2.5	2.8	2.4
24" (60cm)	3.0	3.6	2.9
36" (90cm)	4.0	4.3	3.6



# Freeze Protection Planning Guide and Inventory Checklist

## Section G: Inventory Checklist for Personal Safety / Slip Prevention

**Looking for a safer, cleaner, and better alternative to calcium chloride?** Snow Melting Mats continuously melt snow and ice, helping keep surfaces constantly clear and safe. They are portable and easy-to-install. These durable rubber heating mats lie on top of existing surfaces. Simply plug them into any standard 120V or 240V outlet. A GFCI is included.

Ideal for entranceways, stairs, loading docks, handicap ramps, rooftops, and freezer floors.



HTM: HeatTrak® Snow Melting Walkway Mats

### Walkways Susceptible to Icy Conditions

Walkway Location	Walkway Length	Walkway Width	Available Voltage Supply for Heater (120V or 240V)	Qty of Snow Melting Mats Needed

# Freeze Protection Planning Guide and Inventory Checklist



HRT: HeatTrak® Snow Melting Stair Mats:

## Stairs Susceptible to Icy Conditions

Stair Location	Stair Width	Stair Length	# of Stairs in Location	Available Voltage Supply for Heater (120V or 240V)

**Ordered as a set:** Indicate number of stairs per set at time of order. A set of stair mats is connected with 18" (45cm) long connector cables.

**Freeze Protection Planning Guide and Inventory Checklist Section H: Inventory**

**Checklist for Damaged Heaters That Need to Be Replaced** Use this checklist to identify

any heaters that need to be replaced due to damage.

Heater Location	Heater Type	Issue	Qty of Heaters that Need to be Replaced	Heater Size	Heater Voltage	Heater Wattage

## Section I: Inventory Checklist for Temporary De-icing Heaters

It is always a good idea to have a few flexible multi-purpose heaters on hand in the event of emergency de-icing. HSTAT flexible heating tapes with built-in adjustable temperature controls are ideal to prevent freezing or thaw out frozen valves, pipes, and many other objects. Unlike dangerous blow torches, these heaters are safe, make direct contact with the object to be heated, are moisture and chemical resistant, and can be run unsupervised.



*Do not be left without a few of these lifesavers in the toolbox when freezing occurs.*

### HSTAT Heating Tapes with Adjustable Thermostat Control Order Sheet

Heating Tape Width	Heating Tape Length	Wattage	Part Number (120V)	Part Number (240V)	Qty of Heaters Needed
1" (25mm)	2ft (0.6m)	144	HSTAT101002	HSTAT102002	
1" (25mm)	4ft (1.2m)	288	HSTAT101004	HSTAT102004	
1" (25mm)	6ft (1.8m)	432	HSTAT101006	HSTAT102006	
1" (25mm)	8ft (2.4m)	576	HSTAT101008	HSTAT102008	
1" (25mm)	10ft (3.1m)	720	HSTAT101010	HSTAT102010	

Other widths and lengths are available upon request.

#### Tips:

- Circle Part Number to indicate voltage preference
- Have at least one of each size on hand so that you have the right size when you need it. Shorter lengths are typically used for valves, bearings, pumps, and actuators. Longer lengths are typically used for pipe runs.
- When estimating heating tape lengths, keep in mind that the heating tape cannot be overlapped upon itself. That will cause damage to the heater.



# Freeze Protection Planning Guide and Inventory Checklist

## References

The following references were used in the development of this document.

- Conduct of Maintenance (P950) Operations and Maintenance Manual for Freeze Protection, Criterion 401 R.3, Los Alamos National Laboratory
- Valve Thawing Application Note, BriskHeat Corporation
- BriskHeat Self-Regulating Heating Cable Installation and Maintenance Manual, Part # 11248-06, BriskHeat Corporation
- 13<sup>th</sup> BriskHeat Product Catalog, 13<sup>th</sup> Edition Rev A, BriskHeat Corporation