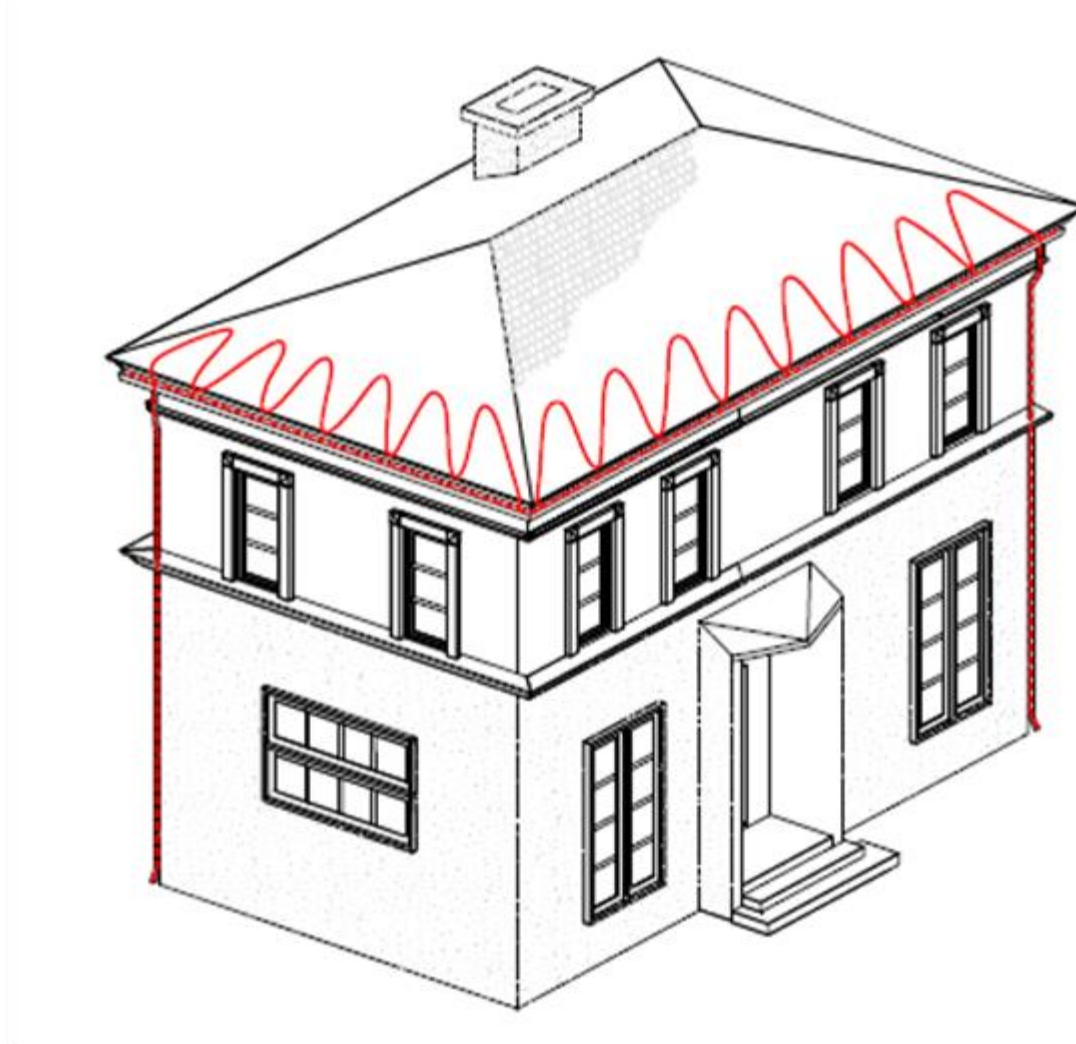


Roof & Gutter Ice/Snow Melting Design Guide



Roof & Gutter Ice/Snow Melting Design Guide

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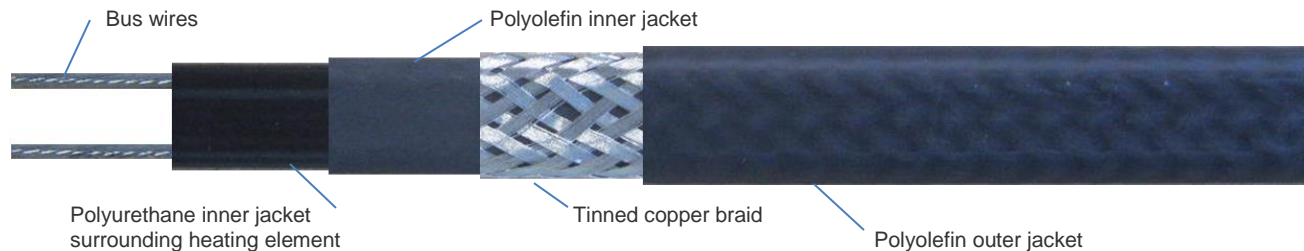
APPLICATION OVERVIEW

Drexan HeatTracer MultiTrace® Products are ideal for maintaining gutters, downspouts and roofs free of snow and ice buildup on industrial, commercial and domestic structures.

MultiTrace is capable of providing de-icing in ordinary locations as well as where excessive moisture is of concern. MultiTrace is designed to self-regulate its heat output by tailoring its current flow to ambient conditions in the most extreme climatic temperatures.



MultiTrace can be cut to length in the field, which allows for quick and easy installations as well as simple additions or modifications to an existing installation.

HEATING CABLE CONSTRUCTION



APPLICATION

AREA CLASSIFICATION	Non-hazardous and hazardous locations	
TRACED SURFACE TYPE	Metal, Plastic, Asphalt, and Wood	
SUPPLY VOLTAGE	MT-5-1	100-130 VAC
	MT-5-2	208-277 VAC

TEMPERATURE RATINGS		APPROVALS	
MAXIMUM MAINTAIN OR CONTINUOUS EXPOSURE TEMPERATURE (POWER ON)	150°F/65°C	CE 2503	II 2G Ex e IIC T6 Gb 12ATEX3095X Class I, Div. 1/2, Groups A, B, C, D Class II, Div. 1/2, Groups E, F, G Class III General Use Ordinary Locations
MAXIMUM INTERMITTENT EXPOSURE TEMPERATURE, 1000 HRS (POWER-ON)	185°F/85°C	 231572	
TEMPERATURE ID NUMBER (T-RATING)	T6: 185°F/85°C. Temperature ID numbers are consistent with applicable electrical codes	 E480818	
MINIMUM INSTALLATION TEMPERATURE	-40°F/-40°C		

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STEP 1 – LAYOUT

The area required to be heat traced will be determined by the size and shape of the structure. For example, an entrance with an overhang may be susceptible to drifting snow accumulation and require the total area to be heat-traced.

Typically, the problem areas of a roof are:

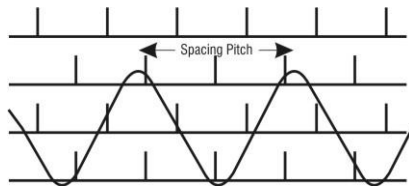
- Roof overhangs without gutters
- Roof overhangs with gutters & downspouts
- Gutters & downspouts only
- Roof valleys & gutters
- Drains and scuppers on flat roofs

STEP 2 – CALCULATING AMOUNT OF CABLE

In instances where extremely cold temperatures and or severe winds are present it is recommended that the gutter and downspouts include 2 runs of MultiTrace.

Installing 2 runs of MultiTrace (down and back) in the downspout eliminates the need for a T-Splice and one end seal.

Roof: To establish the amount of cable required to trace the roof refer to the table below



The amount of snowfall will determine the pitch (spacing) of the cable. For heavy snowfall 12”, medium 18” and light 24”.

Below is the multiplying factor to determine the length of cable required to heat trace a roof up from the edge.

Multiply the factor below by the length of edge in feet.

Example: Roof edge = 100', spacing pitch = 18", up the roof 12".

100 x 2.5 = 250 feet cable. Note: does not include length required for the roof edge or gutter.

		Roof Spacing Pitch (inches)			
		6	12	18	24
Tracing Height Inches up from roof edge	6	1.1	1.4	1.8	2.2
	12	2.1	2.2	2.5	2.8
	18	3.1	3.2	3.4	3.6
	24	4.1	4.1	4.3	4.5
	30	5.1	5.1	5.2	5.4
	36	6.1	6.1	6.2	6.3
	42	7.1	7.1	7.2	7.3
	48	8.1	8.1	8.2	8.3

Gutter: To calculate the length of MultiTrace required to trace a gutter (2 runs) 100 ft. long and two 15 ft.-long downspouts. $100 + (2 \times 15) = 130'$ x 2 runs = 260 ft.

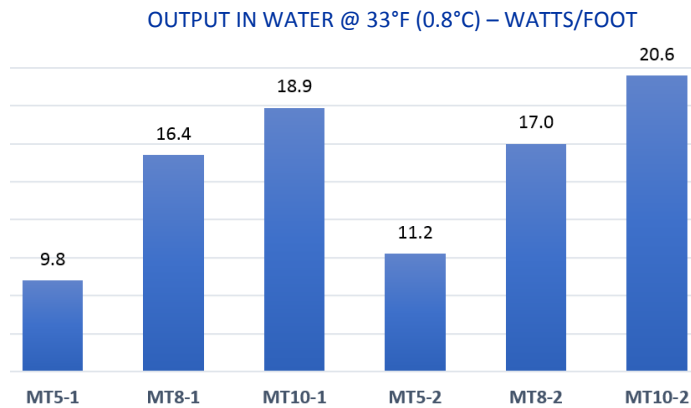
Note: allow 4' extra cable for terminations and allow sufficient cable to reach your power connection point.

STEP 3 – ELECTRICAL REQUIREMENTS

Try to design the MultiTrace heat-tracing system using a worst-case start-up temperature of 0°F / -18°C. If longer circuits are required, you may want to choose a higher start up temperature to increase the maximum circuit length allowed for the appropriate breaker size. However, keep in mind that if the heating system starts up at a temperature lower than that designed for, you may experience breaker tripping.

Tip: selecting a higher voltage allows you to reduce the breaker-size required and in turn allows you to use longer circuit lengths.

POWER OUTPUT ADJUSTMENT FACTOR	
208 V	
5-2	0.89
8-2	0.94
10-2	0.96
277 V	
5-2	1.14
8-2	1.07
10-2	



MAXIMUM CONTINUOUS CIRCUIT (FT) PER CIRCUIT BREAKER	START-UP AMBIENT TEMP.		120V				240V			
			15A	20A	30A	40A	15A	20A	30A	40A
	°F	°C								
MT5-SJP	50	10	190	215	215		385	425	425	
	33	8	160				320			
	14	-10	140	275			365			
	-4	-20	120	240			320			
MT8-SJP	50	10	120	155	165	165	205	275	335	335
	33	.8	100	140			185	245		
	14	-10	90	120	165		215	325		
	-4	-20	80	110	160		150	195	295	
MT10-SJP	50	10	100	130	150	150	100	130	200	265
	33	.8	85	115			90	120	180	245
	14	-10	75	100	85		110	165	225	
	-4	-20	70	90	80		105	155	205	

GROUND-FAULT PROTECTION: Global Electrical Codes require ground-fault protection of components and each heating cable branch circuit to reduce the danger of fire caused by continuous electrical arcing resulting from improper installation or damage to the heating cable. Conventional circuit protection may not be suitable for preventing electrical arcing. Following are some of the ground-fault breakers that satisfy this equipment protection requirement: Square D Type QOB-EPD or QO-EPD and Cutler Hammer (Westinghouse) Type QBGFEP.

COMPONENTS: Drexan offers a full range of components for power connections, splices, and end seals. These components must be used in order to ensure proper functioning of the product and compliance with warranty, code and certification requirements.

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STEP 4 – INSTALLATION

The effectiveness of heat tracing a roof or gutter is determined not only by the design and layout but also by the quality of installation workmanship.

- It is important that the MultiTrace be in contact with the roof and gutter to ensure proper melting.
- Do not install MultiTrace under the roofing materials.
- To prevent damage to the cable where snow might slide from the roof, it may be necessary to install a snow fence near the edge of the roof.
- Downspouts to underground sewers should be traced down below the frost line.
- Roof drains should be heat-traced 12” down into the heated portion of the building.
- Heat-tracing the roof itself is not always necessary. If ice-damming on the roof is not experienced, then heat-tracing the gutters and downspouts should be sufficient.
- If gutters are not present, then MultiTrace installed on the roof must have drip loops extending past the roof edge.
- Roof clips may be secured to surfaces by way of adhesive (not supplied by Drexan) to avoid the use of nails or screws.
- Junction boxes whenever possible should be located under a roof overhang or a similar area to avoid direct exposure to weather and should include drip loops where the cable enters the box.
- On a larger installation using multiple circuits try to locate all the junction boxes in one area to reduce power feed conduits.

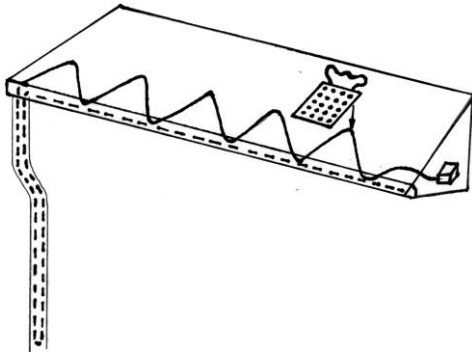
A complete Bill of Materials should include MultiTrace cable, power termination, end seal, roof clips, downspout hangers and control as required.

Trace Heating Redefined

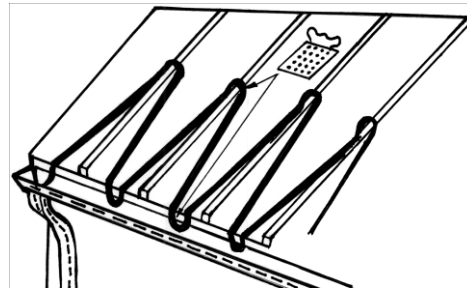
DREXAN ENERGY SYSTEMS OFFERS THE MOST TECHNOLOGICALLY ADVANCED AND STRINGENTLY MANUFACTURED TRACE HEATING SYSTEMS THAT PROVIDE OUTSTANDING COST SAVINGS IN ENGINEERED DESIGN AND FIELD INSTALLATION.



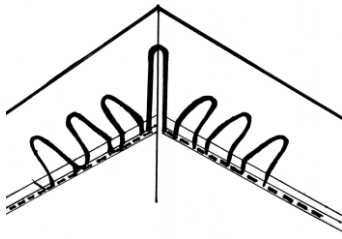
Typical installations below show the proper methods of installing MultiTrace.



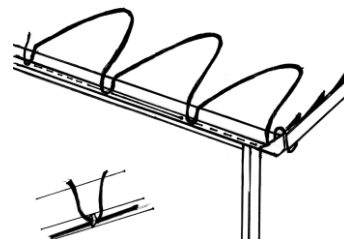
Asphalt Roof



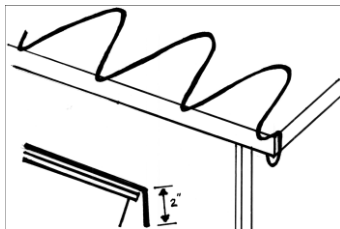
Metal Roof



Heat-tracing a valley, roof edge and gutter.



Heat-tracing a roof edge and gutter.



Installation without gutters

Roof clips may be fastened by way of adhesive (not supplied by Drexan)

STEP 5 – CABLE COMPONENTS

A typical heat tracing system will include cable, cable components and controls as required.

HeatShrink® Components



HS-PC
Power Connection
(Junction box not included)



HS-TSPLICE
Splice Kit



HS-ESK
End Seal Kit

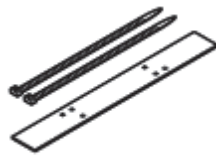


HS-JB
Junction Box
(not ATEX / UL approved)

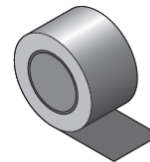
Cable Fastening Accessories



Roof Clip, RC50



Downspout Cable Support, MT-CS



Aluminum Foil Tape, TAPE-AL

STEP 6 – CONTROLS

Snow/Ice Melting Controls

For most heating cable systems, a contactor will be required because the load will exceed the amperage rating of the control unit. To determine the optimum control method, you should consider that when the cables are energized (ambient method) and there is no snow/ice present, power will be consumed unnecessarily. On the other hand, if you rely on manual control and someone neglects to turn on the system when necessary, the inevitable snow/ice will form thereby defeating the original purpose of the installation.

There are three recommended methods of heat tracing control for roof and gutter.

- **Manual Control:** MultiTrace is switched manually. This method requires supervision to work effectively.
- **Ambient Control:** using an ambient thermostat ensures that when the temperature is below freezing the MultiTrace becomes energized. With this method you must recognize that even when no snow/ice is present the cables may become energized and power consumed.
- **Automatic Control:** this method ensures that MultiTrace is energized only when a combination of moisture and low temperature are present, thereby keeping the roof and gutters free of snow/ice. When either the precipitation ceases or the temperature rises above freezing the MultiTrace is turned off thus conserving energy.

