

Pipe heating system questions and answers

1. What is nVent RAYCHEM Frostex cable?

Frostex cable is a part of a self-regulating pipe heating system manufactured by nVent for pipe freeze protection.

2. Where can Frostex cable be used?

Frostex heating cable can be used to freeze-protect aboveground residential water pipes which are insulated and weatherproofed. Frostex cable must be installed with the 9800 Plug Kit. Frostex cable must be plugged into a grounded receptacle located in a dry area. If the cable is used outdoors, the insulated pipes must be suitably weatherproofed.

3. How long have Frostex heating cables been available?

Frostex cables have been sold since 1978. Since then, more than 100 million feet have been sold.

4. Where can I buy Frostex cable?

Frostex cable and accessories are sold throughout the United States in manufactured-housing and plumbing-supply houses.

5. How does it work?

Heat tapes use metal wires to produce a constant heat output, much like the elements in a toaster. Frostex self-regulating heating cable uses a unique conductive polymer core, which continually adjusts its heat output with changing temperature all along the pipe. This is why Frostex cable, unlike some heat tapes, won't burn out if it is wrapped closely together, overlapped, or overinsulated.

6. What is the power output?

Because Frostex systems are self-regulating, the cable's power output must be referenced with some temperature. At 50°F (10°C), it produces a minimum of 3 watts per foot on an insulated metal pipe. At 0°F (-17°C), its minimum output is 6 watts per foot; at 80°F (27°C) it is less than 1.5 watt per foot.

7. How much will I need?

The amount of cable needed depends on the size and type of pipe, and on the lowest expected temperature. Once you know the type of pipe (metal or plastic), pipe diameter, length of pipe, and the minimum expected temperature, use the Length Selection Chart in the installation instructions to determine how much Frostex cable you will need.

8. Can Frostex cable be cut to length?

Yes. Because the cable is a parallel electrical device, it can be cut to length without affecting its power output per foot.

9. Is there a maximum length?

Yes, 50 feet (15 meters) is the maximum circuit length allowed. Going beyond that will lower the heat output, causing a pipe to freeze at the far end and/or blow the built-in nonreplaceable fuse in the 9800 plug.

10. Why has nVent gone to the added expense and effort of including ground-fault circuit protection for the 9800 plugs? The old orange plug had a fuse. Isn't that enough?

No. The 9800 plug has both an internal fuse and a ground-fault device. The fuse protects against excessive current flow. The ground-fault device detects current leaving the closed circuit within milliseconds, and is required by the NEC.

11. What's the signal light for?

The signal light indicates that power is getting to the ground-fault unit. In addition, an illuminated signal light indicates that the ground-fault unit has not tripped and/or the internal fuse has not blown.

12. Will Frostex cable work at voltages other than 120?

Frostex systems are designed to work on 120 Vac. Natural power wattage variance is acceptable.

13. Will it work on DC voltage?

No. Frostex systems are not designed to be powered by DC voltage.

14. How is Frostex cable sold?

It is cut to length from reels at a store, or sold in 100-, 250-, or 500-foot (30.5-, 76.2-, or 152.4-meter) reels. One 9800 Plug Kit is needed for each circuit length, and the maximum circuit length is 50 feet (15.2 meters). In addition, a 50-foot (15.2-meter) TruckPak (including two 9800 plugs and a roll of 9610 tape) is available.

15. How is a Frostex system put together?

Once the Frostex cable is cut to length, the 9800 plug is attached to the power end and a Frostex gel end seal is attached to the opposite end. Specific installation instructions are provided in the 9800 Plug Kit.

16. Is the Frostex cable system UL Listed?

Yes, the Frostex system is listed by UL for residential and mobile home pipe heating applications. Additionally, Frostex cable is approved for pipe freeze protection in domestic/residential applications by CSA International.

17. Is Frostex cable waterproof?

No. Although Frostex cable has a water-resistant insulating jacket, prolonged exposure to water may, over time, cause the cable to stop heating. If the insulation gets wet, the effectiveness of the heating cable is significantly reduced and the pipes may freeze. If the cable is damaged or improperly installed and exposed to water, an electrical short may result, which will trip the ground-fault protection. Damaged cable must be replaced.

18. Can I use Frostex cable on a buried pipe?

No. Buried applications cannot provide mechanical and environmental protection to the cable, and the cable may be damaged by rocks or ground movement.

19. Can I use Frostex cable on a garden hose?

No, Frostex should not be used on hoses or in other applications where frequent flexing could occur.

20. How will I know if the system is working?

The first step is to verify that you have voltage to the plug when plugged in by checking that the signal light lights up. After that, an easy and simple way to check whether your Frostex heating cable is working is to test the temperature of the water coming from the Frostex cable-protected pipe first thing in the morning. This technique is described in the Frostex installation instructions. If this is not possible, or if a more precise method is desired, there are two approaches for those with electrical equipment and experience:

(a) Resistance Measurement Method:

A simple resistance reading is not very meaningful in itself, but if the cable is at a known temperature, comparative readings can be made each year to ensure that the system is working. After ensuring the indicator light is on, unplug the Frostex cable. Then bring the water and pipe to a constant temperature by letting water flow through slowly for at least 30 minutes. Now record the water temperature and the resistance of the cable between the two prongs of the plug. Then, any time you want to check the system, bring the pipe to approximately the same temperature and read and record the resistance. As long as the pipe (and therefore the Frostex cable) temperature is approximately at the reference temperature, the resistance value should remain about the same. Increasing resistance values will indicate that the cable is producing less heat.

(b) Current Measurement Method:

This method is more difficult and requires more experience with electricity. If the length of a circuit is known, and the temperature of the pipe can be determined and stabilized, then the proper heat output can be determined at any time. First, determine the draw in amperes of an energized cable that has been operating for at least 10 to 15 minutes on a pipe of known temperature. Then divide the total amps by the length of the cable to determine the amps per foot. At 50°F (10°C), the current draw should be 0.02–0.04 amp per foot (.06–.13 amp per meter) at 120 Vac. At 80°F (27°C), the current should be 0.01–0.02 amp per foot (.02–.06 amp per meter).

21. I didn't buy enough Frostex cable to protect my entire pipe. Can I splice a small piece onto the end? If not, what should I do?

No, there is no approved kit or procedure for splicing Frostex cable. (Do not attempt to repair damaged cable either. Attempts to repair could result in electrical arcing or a fire.) You can either install a new circuit of the correct length or, if a second power source is available, install a second Frostex circuit to protect the rest of the pipe.

22. Do I have to use insulation? Why?

Yes, insulation must be used with Frostex cable for the following reasons:

- Insulation reduces the heat loss from the water pipe to the point where the cable can make up the difference. The heat loss from an uninsulated pipe might be 20 times that from an insulated pipe.
- Insulation holds the cable in good contact with the pipe so that maximum heat is transferred and a minimum amount is directed away from the pipe.
- Insulation helps protect the cable from damage. The insulation should be nonflammable or flame-resistant, and weatherproof, such as closed-cell foam insulation.

23. What kind of insulation should I use?

Flexible adhesive-backed thermal insulation should not be used with Frostex cable, mainly because these insulating tapes are typically only about 1/8 inch (3.3 mm) thick. In order to protect your pipes from freezing, at least 1/2 inch (13 mm) of thermal insulation must be used. Alternatively, you can use fiberglass insulation, providing it is properly weatherproofed for the application.

Most commonly available flame-retardant and nonflammable insulations work well. Our Selection Guide is based on fiberglass insulation, which, because it is nonflammable, should be insulation of choice indoors, under buildings, and in other dry locations. Closed-cell foam insulations, usually available in preslit tubes 4–6 feet (1.22–1.8 meters) in length, are preferable in outdoor and hard-to-waterproof areas. These are generally made of polyethylene, polyurethane, or polystyrene. Only vinyl foam insulations should be avoided.

24. Will condensation present a problem?

As long as the Frostex cable has been properly installed and maintained, occasional pipe sweating (condensation) is not a problem. However, condensation that soaks and saturates fiberglass insulation can create problems (see answer 17). Saturated insulation should be removed and replaced.

25. Will the gel in the end seal eventually harden? What holds the end seal to the cable?

The gel remains flexible indefinitely, and the cable is gripped by small plastic teeth inside the end seal. However, the end seal cannot be removed without damaging the cable and must not be reused.

26. I live in manufactured housing where our water supply comes from an underground feed line. I need to protect this pipe from freezing, which means approximately two feet of Frostex cable will be below grade. What will happen if it gets wet? How would you recommend I install the cable?

As described above, Frostex cable is not waterproof, and if it lies in water for prolonged periods of time (as in a flooded manufactured-home crock) it can stop working, resulting in frozen water pipes. Therefore, keep it dry. Fully insulate all the exposed piping and put additional wraps of insulation on areas that cannot be heat-traced. Cable should be run down the pipe and back up again so the end seal is not sitting in water. The crock should be protected to prevent it from filling with water.

If you are unsure whether or not you can keep your Frostex system dry, or contact your supplier and ask for the Gardian family of heating cables instead. Or call nVent at (800) 545-6258 for a recommendation.

27. When does it turn on/off? Is there a thermostat?

There is no point at which Frostex cable “turns off” completely. At low temperatures its output is high—at least 5 watts per foot at 0°F (16 watts per meter at 32°C), and at high temperatures its output is very low—less than 1.5 watt per foot at 80°F (4.6 watts per meter at 27°C). See the graph “Frostex power output on metal pipe” and the table on the 9800 data sheet (H56847). At temperatures in between, the output follows a straight line between these values. There is no thermostat, because the black core material continuously adjusts its heat output all along the pipe as the pipe temperature changes.

28. What will it cost to operate?

The answer varies with geography, winter temperatures, insulation type and thickness, and the cost per kilowatt-hour of electricity, but a ballpark figure is possible. A 25-foot (7.6-meter) circuit will use about 2.5 kilowatts of electricity per day in the winter (approximately as much as a 100-watt lightbulb uses). If electricity costs U.S. \$0.10 per kilowatt, that means it would cost about U.S. \$0.25 a day.

29. What is the warranty?

Frostex cable carries a two-year limited warranty, which states in part that if the cable fails to operate “for any reason other than misuse, failure to follow instructions, abuse, or external damage,” it will be replaced. Replacement of cables and connector is the only remedy; there is no cash replacement. Systems should be returned to the dealer or sent back to nVent for warranty replacement. Refer to the limited warranty for complete warranty information.

30. I plan to install Frostex cable on an outside faucet, as pictured in your literature. What procedure would you follow to ensure that the cable stays dry?

There are two considerations here: how much cable to put on, and how to insulate and waterproof it. Depending on the pipe size, from 1 to 2 feet (approximately 0.5 meter) of cable should be wrapped around the faucet (overlapping is allowed). Then the valve should be completely insulated without leaving any gaps. Finally, the insulation should be waterproofed with plastic sheeting, heat-shrinkable sheets, or a combination of these. The cable must be plugged into an indoor or dry-area outlet or one that is protected from water. The 9800 plug and ground-fault unit must be kept dry.

31. Can I install a thermostat on Frostex cable? If so, how do I do it, and what type of thermostat would you recommend?

Frostex systems generally do not benefit from using one. However, thermostats can be used to help save energy. Use a good-quality thermostat that can handle at least 10 amps. Install it according to the manufacturer’s installation instructions.

32. Can Frostex cable be used on a residential oil line?

No. It is intended only for residential aboveground water lines. Any oil products leaking from valves or fittings could cause the cable to stop working, and the Frostex cable does not produce the right amount of heat for residential oil lines.

33. Can Frostex cable be used on a waste line?

You can use Frostex cable on drain or wastewater lines provided they are above ground and not more than 2 inches in diameter.

34. Every year we have a problem with pipes in our kitchen freezing because they are located on an outside wall. Can Frostex cable be installed behind a wall?

No. Installing Frostex cable out of sight (as in a wall or floor space) means that it cannot be inspected. For example, if it is damaged during installation or is damaged by animals after installation, this would not be obvious.

35. What about using vinyl electrical tape to attach Frostex cable to the pipe?

It is okay to use vinyl electrical tape, attaching it at 2-foot (0.6-meter) intervals per the instructions. Preferably, Frostex 9610 Application Tape should be used. There are many types of duct tape, not all of which may be suitable for use with Frostex cable. See the installation instructions for correct taping methods.

36. What can I do to make my older Frostex II installation better?

Replace your existing system with a new UL Listed Frostex system. The Frostex system includes a gel end seal, braid and ground-fault protection plug that will minimize the risk of fire if your Frostex II system is damaged or improperly installed.

Ground-fault protection is an effective way to minimize the risk of fire if the heating cable is damaged or improperly installed, and ground-fault protection is required by the U.S. and Canadian electrical codes.

37. Some old Frostex plugs only had a fuse. Isn't that enough?

No. Fuses provide some protection against the risk of fire but are not as effective as ground-fault protection. In addition, just using a fuse does not ensure compliance with the U.S. and Canadian electrical codes.

North America

Tel +1.800.545.6258
Fax +1.800.527.5703
thermal.info@nVent.com

Europe, Middle East, Africa

Tel +32.16.213.511
Fax +32.16.213.604
thermal.info@nVent.com

Asia Pacific

Tel +86.21.2412.1688
Fax +86.21.5426.3167
cn.thermal.info@nVent.com

Latin America

Tel +1.713.868.4800
Fax +1.713.868.2333
thermal.info@nVent.com



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