

Hydronic Heat

THAWING

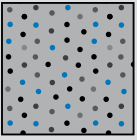
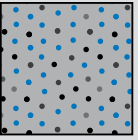
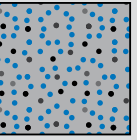
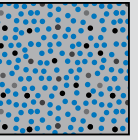
Problem: Ice in the soil!

Frost facts:

- Soil does not freeze
- Water in soil freezes
- Ice binds soil
- Melting ice requires 143 BTU's per pound!

Thaw time factors:

- BTU's delivered per sq. ft.
- Hose spacing:
 - Closer = More BTU's per sq. ft.
 - More BTU's = faster thaw
- Soil type & moisture content
- Insulation layers

Ice content of frozen soil				
Soil type	Gravel	Sand	Clay	Silt
				
Ice lbs / ft ³	5 to 7	14 to 18	16 to 22	15 to 52
Btu's to melt ice	up to 1001	up to 2574	up to 3146	up to 7436

Thaw time in days*										
Frost Depth ft (m)	1 (0.3)		2 (0.6)		3 (0.9)		4 (1.2)		5 (1.5)	
Hose Spacing in (cm)	18 (45)	12 (30)	18 (45)	12 (30)	18 (45)	12 (30)	18 (45)	12 (30)	18 (45)	12 (30)
Sand	1.0	0.75	2.0	1.5	3.0	2.25	4.5	3.25	6.0	4.5
Gravel	1.0	0.75	2.5	2.0	4.0	3.0	6.0	4.5	8.0	6.0
Clay	1.75	1.25	3.5	2.5	5.5	4.0	8.0	6.0	11.0	8.5
Silt	2.0	1.5	4.5	3.5	7.0	5.5	10.5	7.5	14.0	10.0

*Performance will vary based on moisture level and insulation. Use Red Wave™ conductive blankets for optimum performance.

Ground Heater setup:

1. Prepare Site

Scrape snow and ice from thaw site.

2. Position Heat Transfer Hose

Place hose as directed by Ground Heaters' thaw plan over thaw site area. A closed system, only heat goes into ground.

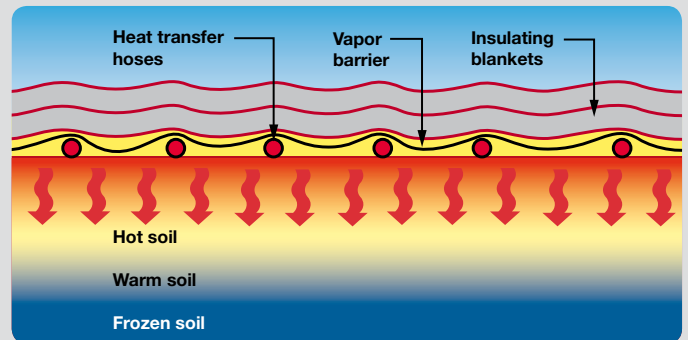
3. Lay Poly Vapor Barrier

Containing water vapor improves thawing.

- Prevents loss of heat
- Keeps soil moist for better heat conduction
- Keeps blankets clean

4. Place Red Wave™ Conductive Blankets

Prevent heat loss and direct heat laterally and into ground. Requires 2 to 3 layers. Red Wave conductive blankets optimize thaw performance.



Application determines hose spacing:

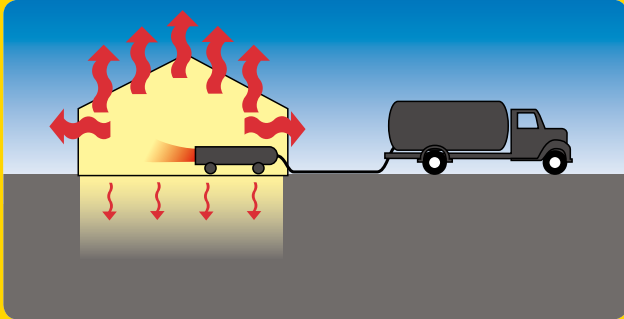
- Excavation** Hose spacing 18-24 in. (45-60 cm). Frost islands can be easily excavated.
- Concrete** Hose spacing 12-18 in. (30-45 cm). Complete thaw without frost islands.
- Accelerated** Hose spacing 6-12 in. (15-30 cm). Fast, no frost islands between hoses.



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THAWING

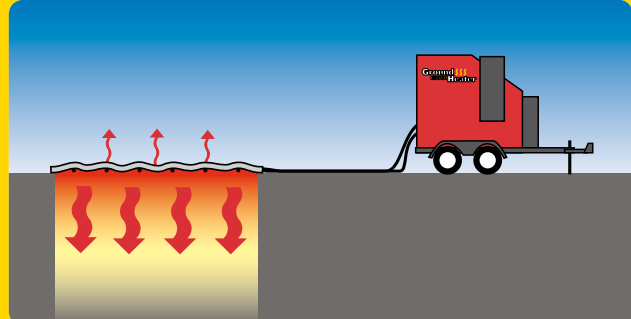
Thaw method cost and time comparison



Cost: Traditional Method
ft³ = \$1.33 Time: 25 days

Only 15% of the heat is conducted into frozen ground, 85% used to heat structure.

- Cost to build enclosure
- Uneven curing, curling and chalking
- Noxious fumes with open flame hazard
- Huge fuel bills



Cost: Ground Heater
ft³ = \$0.15 Time: 3 days

94% of the heat is conducted into frozen ground!

- No enclosure to build with easy set up
- Uniform curing
- No open flame or noxious fumes
- Easy temperature control result in fuel cost less than \$50 per day

Note: Figures above are based on average rates/costs. Actual rates/costs incurred may vary depending upon geographical location, soil conditions, etc. 6000 sq. ft. x 3' deep frost = 18,000 cu. ft.

Best thaw solution: Ground Heaters

- Speed** – typically 1 foot deep/day
– delivers heat directly to thaw surface
– engineered for most BTU's/square foot
- Cost** – uses fuel efficiently; fuel costs per cu. ft. thawed
Ground Heater = \$0.02
Traditional = \$1.00
- Ease** – no enclosures to build
– setup and operation are simple
- Coverage** – up to 18,000 sq. ft./application
- Depth** – up to 10 feet/application
- Safety** – CSA certified in U.S. and Canada
– US NHTSA and Transport Canada compliant

To ensure even heat distribution for thawing applications, use Red Wave™ laterally conductive blankets, available from your Ground Heaters™ distributor.

