

Why are we concerned with under-slab insulation?

Heat loss from a building comes about in two ways:

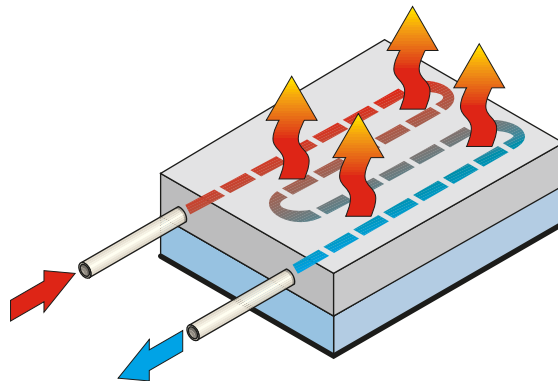
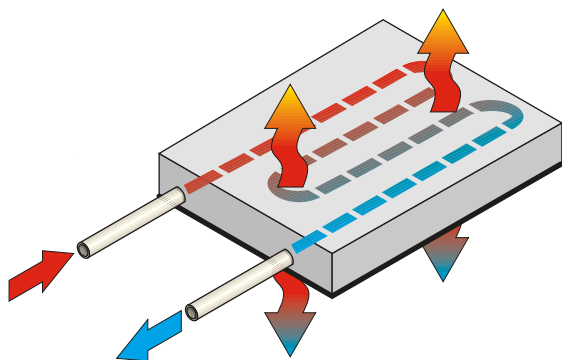
1. By *conduction*: via surfaces that are warm on the inside and cold on the outside.
2. By *air leakage*: via infiltration of cold air through cracks and gaps of windows and doors.

Consider heat loss from a building via the first mode—*conduction*. Here heat energy travels downward to the earth mass underneath through the concrete slab. When there is a temperature differential across an object the heat flows through the object—from hot to cold. The rate of heat flow largely depends on the object's thermal resistance. The greater the object's thermal resistance, the lesser the experienced rate of heat flow. Insulation increases thermal resistance.

When installing a radiant floor heating system, *insulation* is necessary. Insulation ensures your system is heating the intended areas and not the ground along with it. Since the edge of a slab is an area especially prone to high heat loss because of its greater exposure to lower ambient temperatures, insulating only the *perimeter* was practiced. It is recommended that insulation be placed under the entire slab. In fact, according to the new Canadian building code/2003, a minimum of R-5 insulation throughout the entire floor area is mandatory. Insulating to the perimeter only will no longer be acceptable. Ideally, the under-slab insulation should be increased to 2" R-10 extruded polystyrene, or a comparable R-10 insulation. Use 2" insulation as a thermal break at the edge of the slab whenever possible.

The rigid foam insulation under the slab greatly reduces the downward heat flow from the slab into the soil. In cases where radiant floor heating systems are installed with no slab insulation, the soil under the slab absorbs much of the heat transferred to the slab until the soil finally achieves a near-equilibrium condition with the slab. This greatly increases the sluggishness of the system during warm-up periods because it is dragged by the vast earth mass underneath. It also results in greater downward heat losses. Of course, insulation can be omitted under bearing pads that support columns, or footings that support bearing walls where insulation is inappropriate for structural reasons.

In an April 2000 study to determine the effectiveness of insulation system used below radiant floor slabs (John Straube Building Envelope Engineering, Waterloo, Ontario, Canada), it was concluded that heat loss, through an uninsulated radiantly heated slab, can be reduced by as much as 46% if insulated with 2" extruded polystyrene of R-8. Heat losses through radiantly heated slabs were found to be over twice that of otherwise similar unheated slabs. Since heat loss through radiantly heated floors can be so much higher than heat losses through heated slabs, normal rules and practices for insulating unheated slabs clearly do not apply to radiantly heated slabs.



Heat Link[®] Canada

Manufactured & Distributed by HeatLink Group Inc.
Head Office:
 4603E - 13th Street NE
 Calgary, AB, T2E 6M3
 Toll Free: 1-800-661-5332 Phone: (403) 250-3432
 Fax: 1-866-450-1155
Mississauga Office:
 1555 Bonhill Road, Unit #7
 Mississauga, ON, L5T 1Y5
 Toll Free: 1-800-661-5332 Phone: (905) 795-8289
 Fax: 1-866-450-1155

Heat Link[®] China

Distributed by Cathy-Links International
 Phone: 852-25693213
 Fax: 852-25359271

Heat Link[®] Ireland

Distributed by Jamoni Ltd.
 Phone: 057 - 932 4062
 Fax: 057 - 932 4063
 Free Phone: 1800-311338

Heat Link[®] Mexico

Distributed by Distributora Caisa S.A. de C.V.
 Phone: (52) 3300-4400
 Fax: (52) 3300-4406

Heat Link[®] USA

Distributed by HeatLink Group Inc.
 Toll Free: 1-800-661-5332
 Fax: 1-800-869-6098