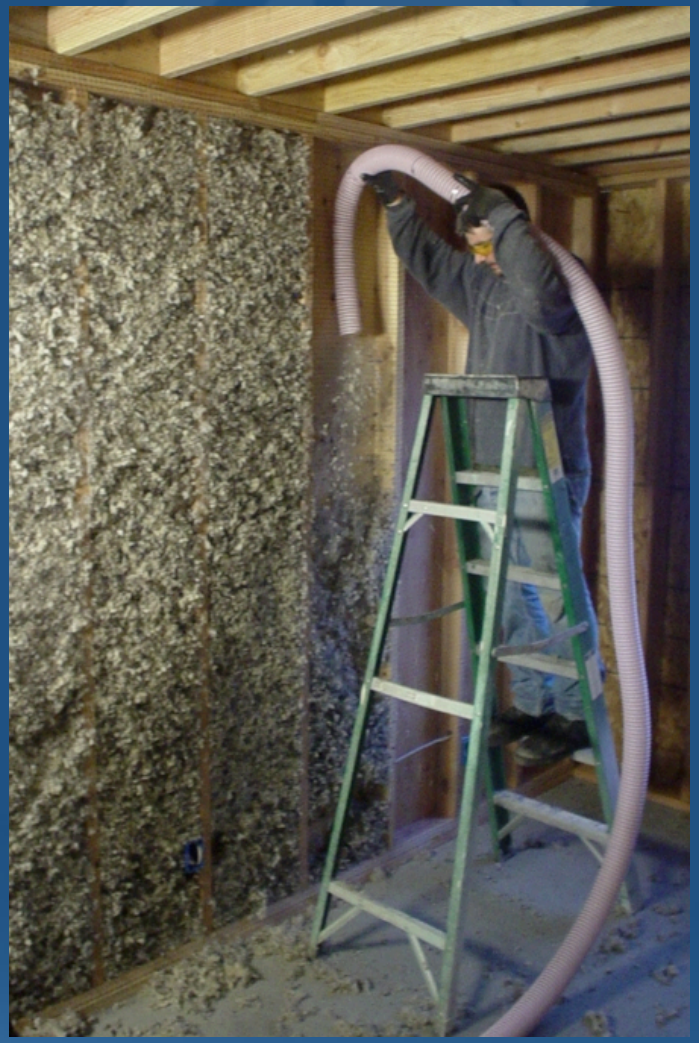
Hemp batt insulation

Hemp insulation from Nature Fibres, Quebec
Photos: Alex Wilson

Sheep’s wool loose-fill insulation



Loose-fill wool insulation
Photos: Oregon Shepherd

Sheep’s wool loose-fill insulation – new product

Loose-fill wool insulation - Photo: Paragon Wool Products

Perlite loose-fill insulation

Perlite insulation – photo: DFL Minmet Refractories Corp

- Expanded perlite used in horticulture and as a building insulation
- Relatively uncommon today – but attractive environmentally
- Over 20 manufacturers
- Totally inert, firesafe
- R-value up to R-3.7 per inch
- Not related to vermiculite, which is often contaminated with asbestos

Cementitious foam

Spray-applied cementitious foam – photo: Air Krete

- 100% inorganic
- Magnesium oxide cement
- Inert, noncombustible
- Friablility the biggest drawback
  - Requires careful controls during installation

Cementitious foam – masonry applications

Cementitious foam filling masonry cavities
Photos: Air Krete

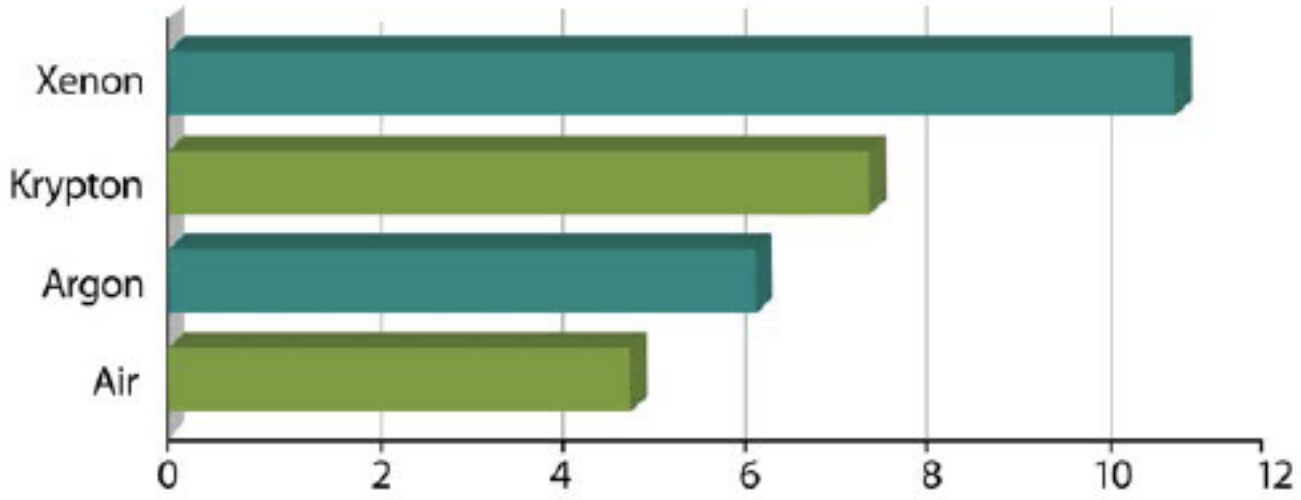
Gas-filled panels

Inflated gas-filled panel
Photo: Fi-Foil

- Honeycomb structure filled with low-conductivity gas
- Same principle as glazings using gas-fill
- Technology developed at Lawrence Berkeley National Lab
- Licensed to a manufacturer of radiant insulation
- Long-term performance uncertain

Gas-filled panels – R-value 1.5” thickness

Figure 3: R-Value for Gas-Filled Panels Using Different Gases



Source: Fi-Foil Company

Translucent insulation - Silica Aerogel

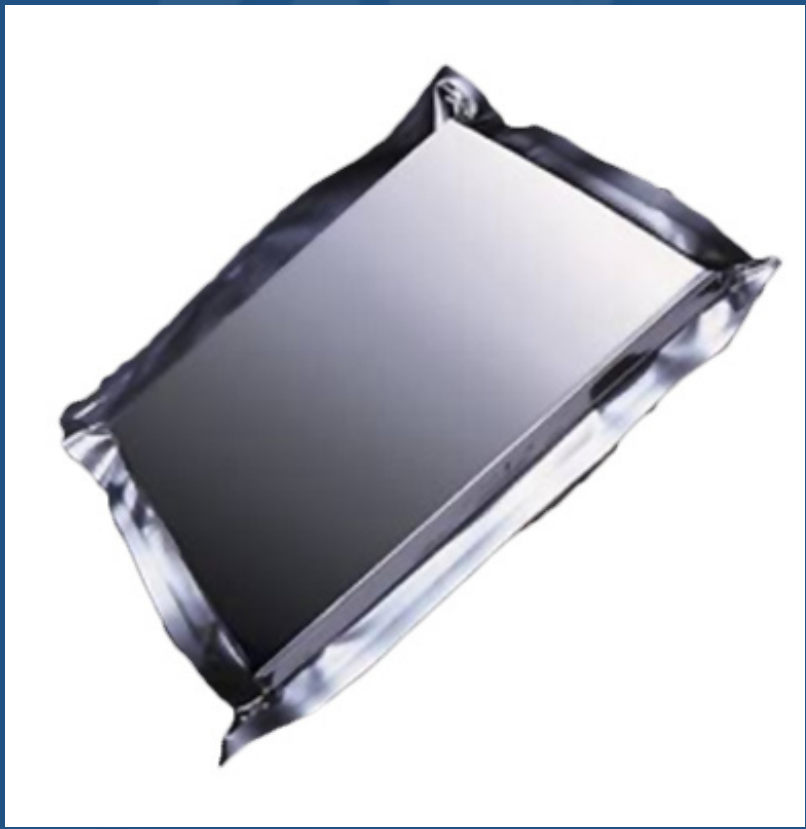
- Granules of silica aerogel – the lightest-weight solid known
- Spongy, translucent
- Can be used in glazing (for daylighting)
- Also applications as appliance insulation
- Manufactured in several plants around the world and supplied to various manufacturers

Silica aerogel insulation granules
Photo: Cabot Corp.

Silica Aerogel – turning glazing into insulation

Translucent glazing panels insulated with silica aerogel – photo: Cabot Corp.

Vacuum insulation



Photos: Nanopore and Panasonic

Spray foam Insulation – What to use, When, and How?

Factory production

Site-manufactured

My own use of spray foam

BASEMENT

- water mgmnt: damp, not wet
- air tightness – "zero," step cracks & windows
- heat flow – masonry @ R .1/inch at best
- vapor flow – need drying in both directions
- radon: 6 pc/l
- oil furnace