Wine Cellars
Uninsulated wood frame/wood floor above (must not be steel studs)

Two layers of 1" thick unlaced extruded polystyrene (XPS) with joints offset horizontally and vertically; each layer taped with exterior sheathing tape

Untreated 1x4 wood furring with stainless steel screws

Acrylic latex sealant (applied as each layer of foam is installed)

Interior lining (wood/non-paper faced gypsum board skim coated with plaster)

Uninsulated wood frame

See Figure 2b for alternative wood floor detail
Interior lining (wood/non-paper faced gypsum board skim coated with plaster)

Two layers of 1”-thick unfaced extruded polystyrene (XPS) with joints offset horizontally and vertically; each layer taped with exterior sheathing tape

Tile floor adhered with thinset to anti-fracture membrane

1/8” cement board underlayment (no wood fiber-based underlayment)

Untreated 1x4 wood furring with stainless steel screws

Uninsulated wood frame

Acrylic latex sealant (applied as each layer of foam is installed)

1” XPS rigid insulation

Wood subfloor

Wood/wood-based floor framing

Alternative on a wood/wood-based floor
Uninsulated wood frame/wood floor above (must not be steel studs)

Two layers of 1"-thick foil-faced foam with joints offset horizontally and vertically; each layer taped with exterior sheathing tape

Untreated 1x4 wood furring with stainless steel screws

Acrylic latex sealant (applied as each layer of foam is installed)

Interior lining

Uninsulated wood frame

See Figure 1b for alternative wood floor detail
Interior lining

Two layers of 1”-thick foil-faced foam with joints offset horizontally and vertically; each layer taped with exterior sheathing tape

Tile floor adhered with thinset to anti-fracture membrane

Membrane waterproofing adhered to cement board underlayment with non-latex modified mortar

1/2” cement board underlayment (no wood fiber-based underlayment)

Untreated 1x4 wood furring with stainless steel screws

Uninsulated wood frame

Flashing

Acrylic latex sealant (applied as each layer of foam is installed)

1” XPS rigid insulation

Wood subfloor

Wood/wood-based floor framing

Alternative on a wood/wood-based floor
Hollow Back
Scratch Back
Hollow or Scratch Back
What is the function of these holes?
Hyperbolic Curves
Hyperbolic Curves – two curves
Eccentricity greater than one
Parabolic Curve – single curve
Eccentricity of one
Hyperbolic Curves – two curves
   Eccentricity greater than one
   \[ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1 \]

Parabolic Curve – single curve
   Eccentricity of one
   \[ Y = ax^2, \text{ } a \neq 0 \]
a : semi major axis

\( c \) : linear eccentricity

\( c/a \) : eccentricity

vertex

focus

center

asymptote
a : semi major axis

b : linear eccentricity

b/a : eccentricity
Grow Rooms
Steam Showers
Figure 1c. Gypsum, hydrated from plaster of paris and water, porosity 30 per cent.

Figure 1b. Brick, sintered clay, porosity 40 per cent.