

About: HIGH MASS and PASSIVE HEATING & COOLING

1. What exactly is high mass and passive heating and cooling

Mass refers to a materials' capacity to store energy. Different materials have different capacities. A pound of water, for example, stores three times as much energy as a pound of wood, twice the amount of energy as concrete and over 3000 times as much energy as a pound of air.

In the winter when the sun's energy enters the windows of a home the building masses are heated up...including the mass of your body. If you are sitting in front of a sunny window your body mass receives the comfort of collecting and storing the sun's energy. As you walk into a cool room you feel chilled as your stored body heat is radiated back to the materials around you.

The interior of a building behaves similarly. The building masses – tile or concrete floors, wood, wallboard, etc. – are heated up by the sun and then radiated back into the space when it cools down, thereby providing continued warmth. On that basis all homes are unintentionally, yet inherently, passively heated by the sun.

Cooling in the summer works the same way, but in reverse. By opening the windows in the evening, the heated masses are now cooled by the night air, thereby providing "coolth." Then, as the hot summer day begins to heat up the house, the stored "coolth" of the building mass is radiated back into the space cooling it down.

Living Systems' high mass homes, however, are designed to optimize this naturally occurring phenomena. Here is how:

Passively heated and cooled homes depend first on a very well insulated building envelope to reduce heating and cooling loads. The home must also be properly oriented toward the sun to allow for the maximum amount of sun to enter in the winter while blocking the sun from entering in the summer. By balancing the amount of energy that enters the windows in the winter with the right type, amount and distribution of building mass, the building mass now becomes the primary heating system, storing energy during the day and releasing it at night.

Living Systems has also mastered the art and science of sunlight diffusion and distribution to the building masses. This results in a warm indirect light evenly distributed throughout the space thereby avoiding the uncomfortable glare of direct sunlight as well as the over-heating that often characterizes "passive solar homes."