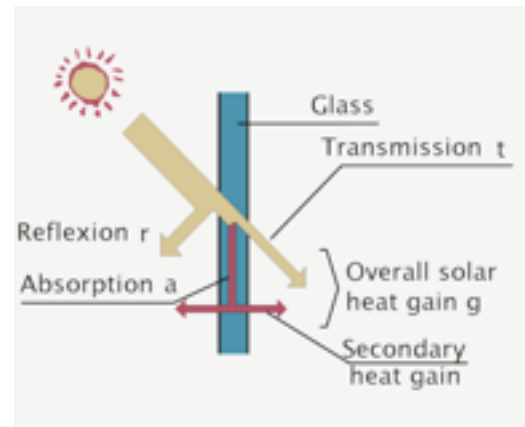
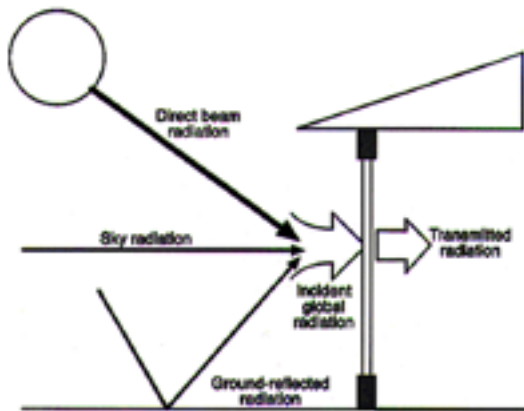


Radiation types (weather files)

Global, direct, and diffuse radiation and solar transmission through glass.

Solar radiation is formed by visible and near visible component of the electromagnetic radiation emitted by the Sun. Weather data files measure radiation intensity, by three different methods:

- ▶ **global** radiation, is the sum of direct and diffuse radiation and it can be considered as the total radiation that comes from the sun onto an horizontal surface. It is the daily available energy coming from the Sun on that surface. It is usually measured in J/sq m, with higher values during the summer in clear sky conditions and lower during the winter (or cloudy days).
- ▶ **direct** radiation, or direct beam radiation, is that portion of the solar radiation that directly hits the surface of the hearth. It arrives onto the surface with a straight line.
- ▶ **diffuse** radiation, is that part of the solar radiation that hits the surface after having been reflected by the particles and other bodies (also gasses deflect solar radiation) present in the atmosphere. The diffuse radiation arrives from all directions and is usually higher during cloudy days and lower with clear sky conditions.



To assess indoor thermal comfort is important to understand what happens when sun rays strike the window glass:

- ▶ **transmitted** radiation, a great part of the energy and light (depending on the glass) pass through the glass and heat the indoor space.
- ▶ **absorbed** radiation, the glass itself is capable of absorb the solar radiation and accumulate energy which is then release both outward and inward. The latter produces a secondary heat gain for the indoor space.
- ▶ **reflected** radiation, depending on the angle of incidence and the characteristic of the glass part of the solar radiation striking the glass is reflected off toward the outside of the building.

Depending on the climate (hot/cold) and the design strategy, the transmitted component of the solar radiation might be a valuable ally or a dangerous foe in the pursuit of indoor thermal comfort. It can be used to heat the floor and the other interior components, to take advantage of thermal mass to heat up the space (cold climate), or it might be preferable to reduce it employing a Low-E glass to decrease the solar heat crossing the glass (hot climate).