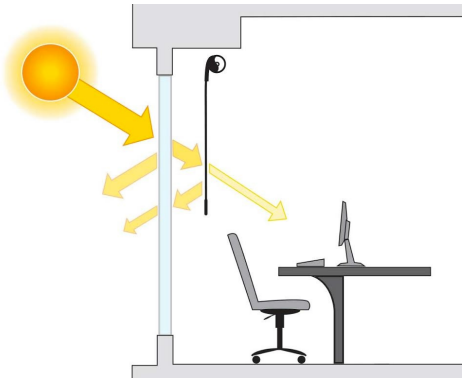
Thermal Management

Thermal management is a primary concern on façades that receive direct sun and do not have window glass that is designed to minimize solar heat gain.



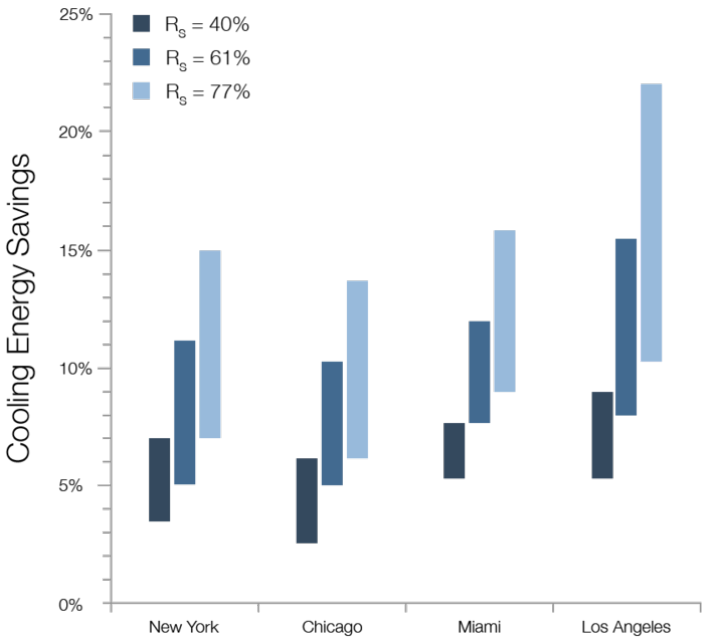
How is thermal comfort affected by shades?

- An occupant's perception of thermal comfort depends both on room temperature and heat radiation from interior room objects, surfaces and the sun.
- Without a solar barrier, radiant heat from direct sun, as well as the warm glass, can make occupants feel much warmer than the interior room temperature would indicate.
- Shades can be specified with high Solar Reflectance (Rs) values to improve thermal comfort.
- Dark shades with low Rs values absorb and re-radiate solar heat and do not provide significant protection from solar radiation.

Solar Reflectance (Rs) - the solar reflectance of a shade fabric is the percentage of total radiation that is reflected off the exterior face of the fabric. Although the glass may reflect some of the radiation back into the space, shades are able to reflect solar heat back out of the building.

Design Considerations:

- Selecting a fabric to reduce solar heat gain does not typically require a compromise with daylighting and visual comfort.
- There are many fabrics available that have a high reflectance value. Tip: an Rs value greater than 30% will provide some protection, while a value greater than 50% provides good solar protection.



A Lutron commissioned study by Purdue (2010) showed the cooling energy savings benefit of adding automated shades with high solar reflectance to a building without shades.

Specifically, the savings shown is based on an open/closed automated shading system designed to eliminate periods of intense light level. Neither the baseline (no shades) nor the new systems (automated shades with high solar reflectance fabric) utilized lighting controls for daylight harvesting. The ranges of energy savings shown occurs based on variation due to window to wall ratio (WWR) and glass solar heat gain coefficient (SHGC). The highest energy savings occurs with large windows (WWR = 75%) and clear glass (SHGC = 0.47). The lowest energy savings occurs with smaller windows (WWR = 45%) and slightly tinted glass (SHGC = 0.4). Similar results were found for peak cooling demand reduction. Lower savings are likely for glass with greater solar control.

Using Thermal Comfort in the Fabric Wizard:

- In the Fabric Wizard, use the Thermal Comfort filter to find fabric with thermal benefits.