scSTREAM

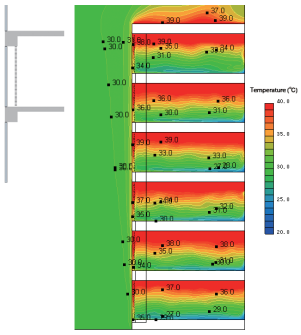
Cradle
MSC Software Company

# Effectively Reducing Thermal Load on External Walls

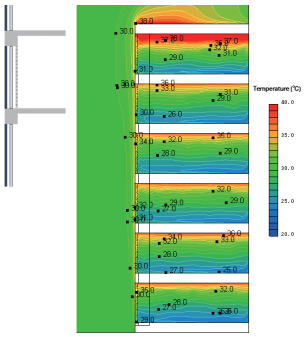
scSTREAM estimates the effect of low-e glass and double skin facade application

## Less Solar Radiation Effect by Low-E Glass Application

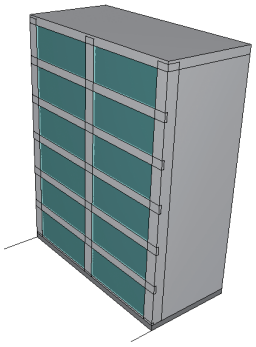
### Difference between ordinary glass and low-e glass



Indoor temperature distribution with ordinary glass (FL10)
Average indoor temperature is 35.4˚C



Indoor temperature distribution with low-e double glazed glass (Low-E8+AS6+FL8)*
Average indoor temperature is 29.5˚C



* Same indoor air-conditioning setting applied. Outdoor temperature is 30˚C.
* Indoor blinds are drawn horizontally.

* Low-E8: Low-E glass, AS: Layer of air, i.e. 6mm, FL: Float glass

**Setting Conditions**

- Solar Radiation: 12pm on Sept. 1, Tokyo
- Wind Speed: Calm
- Outdoor Temperature: 30°C
  - * Solar Radiation is mostly absorbed/reflected by double skin facade and indoor blinds.
  - * Half open louvers are placed at inlets/outlets of double skin facade.
- Indoor Air-Conditioning: Air supply temperature 24°C (6.6 air changes per hour)

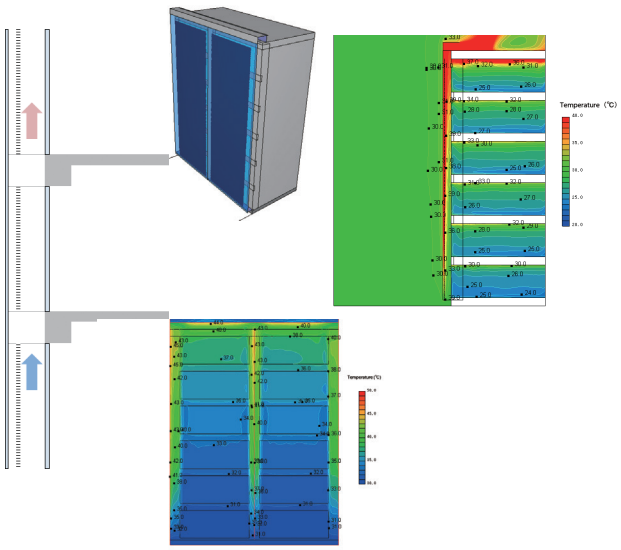
**Calculation Conditions**

- Number of Mesh Elements: 5,499,792
- Calculation Time: Approx. 5 hours for 1000 cycles (degree of parallelism of 8), steady state calculation

## Estimating Indoor Temperature Change by Double Skin Facade Application

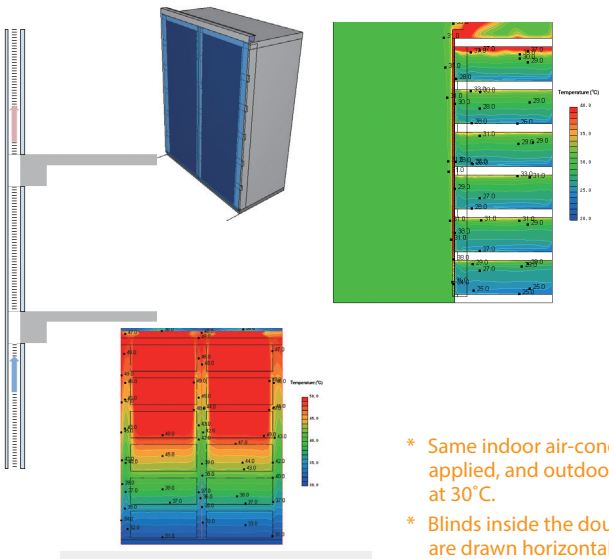
### Effect of different double skin facade widths

Indoor temperature distribution with 700mm double skin facade
Average temperature of middle floor space: 27.3˚C



Temperature distribution in central section of double skin facade

Indoor temperature distribution with 200mm double skin facade
Average temperature: 28.2˚C



Temperature distribution in central section of double skin facade

* Same indoor air-conditioning setting applied, and outdoor temperature at 30˚C.
* Blinds inside the double skin facade are drawn horizontally.
* Ordinary glass (FL10) is used for both outdoor/indoor double skin facade.

## Notes

Studying heat resistance in window and door openings is one of the most important factors when evaluating thermal load on buildings. scSTREAM provides detailed prediction of indoor-outdoor temperature difference and spatial distribution. This helps determine if further adjustments are necessary, for example when the window side still remains hot even though the indoor temperature is average, or when the heat balancing effect appears to be less functional towards upper floors.