



BUILDING GLASS ROMANIA





“Multicomfort” glasses for multicomfort houses

SGG **PLANISTAR[®] SUN**

Conferinta **AAECR**
Bucuresti, 12 Mai 2017

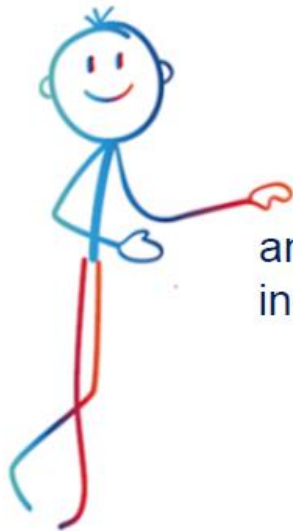
Leon Buzatu
SGBGRO



Comfort & Sustainability

BUILDING GLASS ROMANIA





Comfort

answers today's individual needs

&

Sustainability

addresses tomorrow's collective challenges



COMFORT

SUSTAINABILITY

		feel	Skin/Touch Thermal Sensation
		see	Eyes/Visual Light Aesthetics
		hear	Ears Acoustics
		breathe	Nose Smell Air quality

Human well being Comfort Health Safety	people 
Less environmental impact & pollution Less use of natural resources & energy	planet 
Affordability Decreased operating costs Reduced health costs Increased property values Secured investor incomes Increased productivity at work	prosperity 

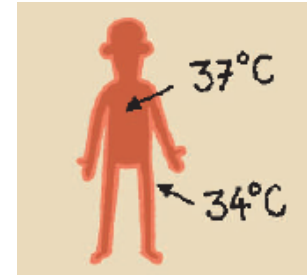


Thermal comfort Physics...

THERMAL COMFORT PHYSICS...

What our body needs?...

Maintain the temperature within the good range



Extreme temperatures goes to be fatal...



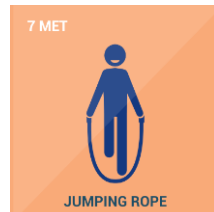
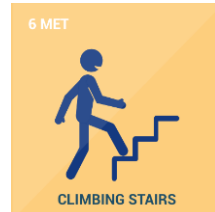
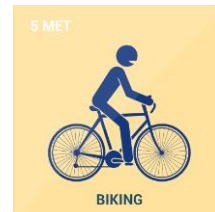
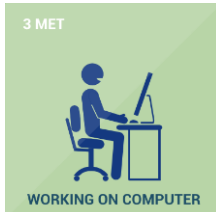
THERMAL COMFORT PHYSICS...

How the body controls the T ° level

Body thermal sensors measure T °. Perception depends on:

→ environment conditions

→ activity (the body generates more or less energy...)



MET (**M**etabolic **E**quivalent of **T**ask) is the ratio of the work metabolic rate to the resting metabolic rate.


$$1 \text{ MET} = 1 \frac{\text{kcal}}{\text{kg} * \text{h}}$$

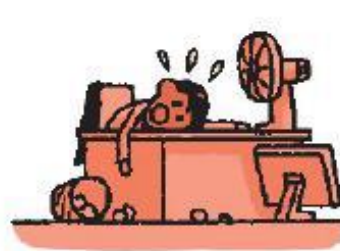
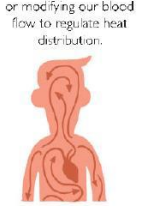
THERMAL COMFORT PHYSICS...

How the body controls the T° level

Thermal sensors measure $T^{\circ} \rightarrow$ comparison with needed T° range

If measured T° is out of needed range
 \rightarrow the body uses several mechanisms to regulate T°

 What we feel is directly linked with our body temperature control!





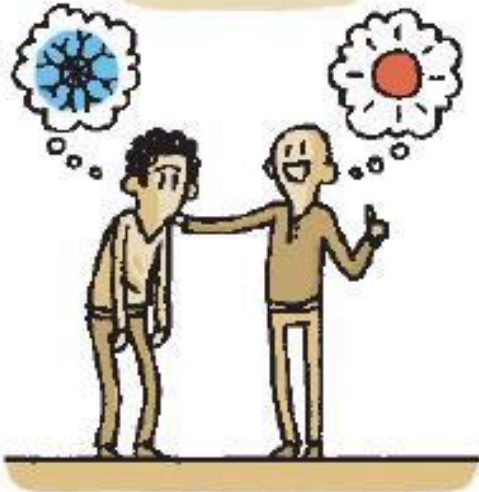
Thermal comfort

Psychological and Social aspects...

THERMAL COMFORT

PSYCHOLOGICAL & SOCIAL ASPECTS

Our current emotional state, mood or level of fatigue...



our thermal history and social background...



as well as other environmental factors such as noise or glare.





Thermal comfort Environment

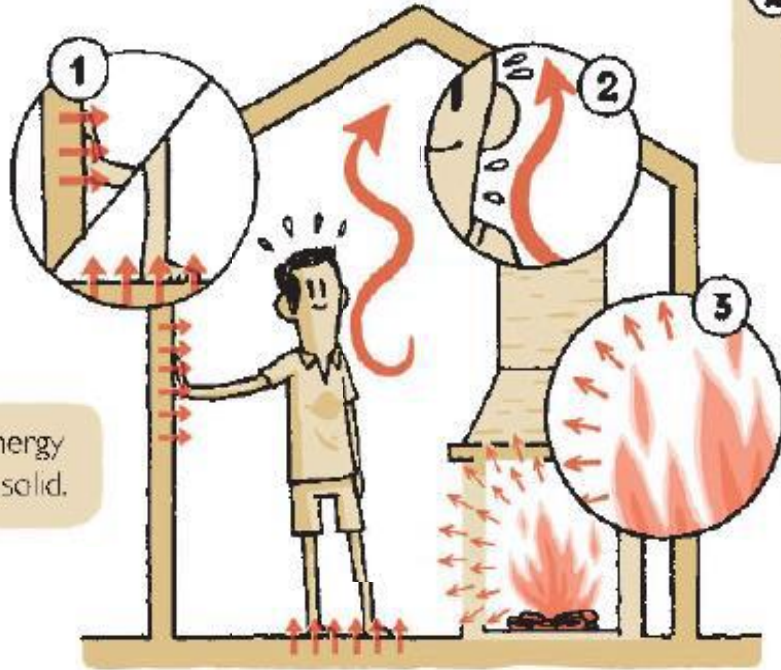
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SAINT-GOBAIN

HOW TO DEFINE A THERMALLY COMFORTABLE ENVIRONMENT?

INTERACTIONS BETWEEN OUR BODY & THE ENVIRONMENT – HEAT TRANSFER



① Conduction is energy transferred via a solid.

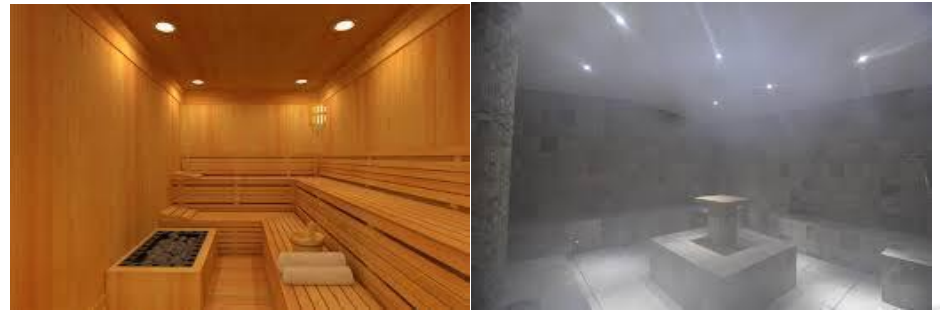
② Convection is energy transferred from a solid to an adjacent gas or liquid.

③ Radiation is energy emitted from a surface.

HOW TO DEFINE A THERMALLY COMFORTABLE ENVIRONMENT? MOISTURE TRANSFER - THROUGH RESPIRATORY SYSTEM & SKIN

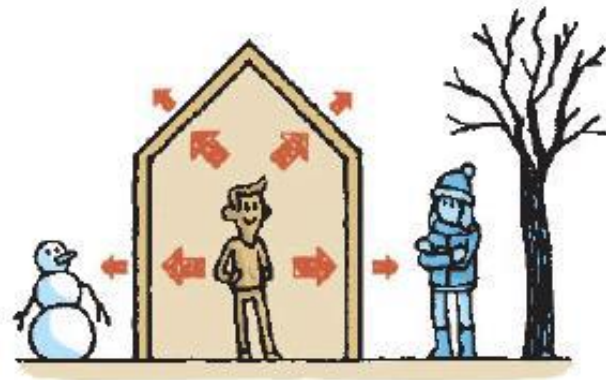


Eg: Sauna vs Hamam



HOW TO DEFINE A THERMALLY COMFORTABLE ENVIRONMENT? GLOBAL VS LOCAL COMFORT

Global



Local



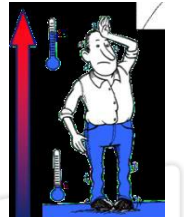
Draught

Radiant
 T°
asymetry



Warm,
Cold
floor

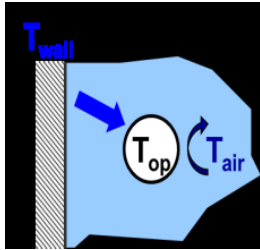
Vertical
air
gradient



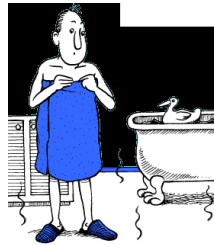
HOW TO DEFINE A THERMALLY COMFORTABLE ENVIRONMENT?

THERMAL COMFORT QUANTIFICATION

Several criteria to quantify thermal comfort...



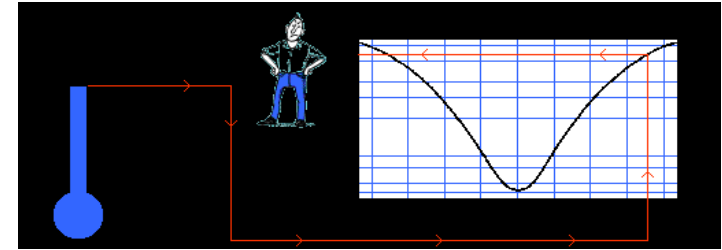
Operative temp.



Floor temp.



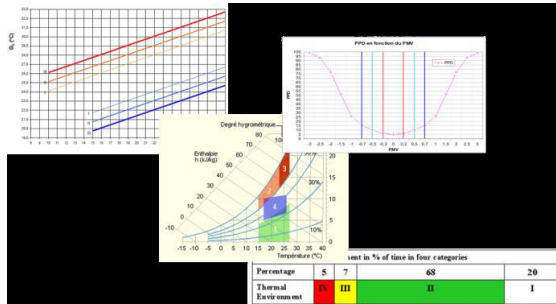
% humidity



PMV/PPD

Predicted Mean Vote
Predicted Percentage of Dissatisfied

... and Limits

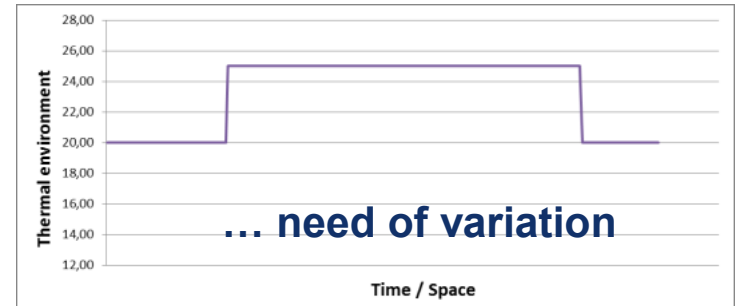
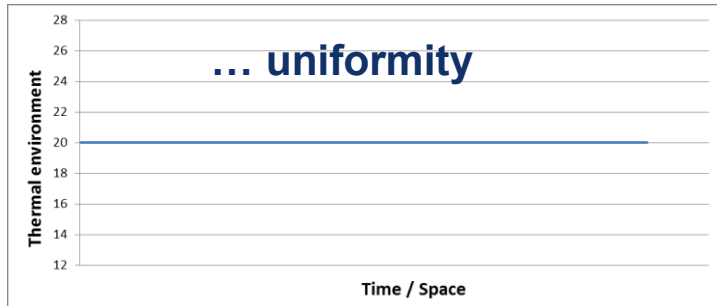


A range of comfortable environments!

HOW TO DEFINE A THERMALLY COMFORTABLE ENVIRONMENT? AVOID BORING ENVIRONMENT...

Feeling comes from variations...

When the sun is warm on my face and the breeze is cool, I know it is good to be alive.” – Lisa Hescong



HOW TO DEFINE A THERMALLY COMFORTABLE ENVIRONMENT?

SUM UP...

Summarize

- ❖ A comfortable environment is defined by:
 - To adapt physical parameters
 - For a specific activity
 - Considering a certain level of clothing
- ❖ There is a range of values for comfortable environment
- ❖ Feeling (bad or good) is coming from variations
- ❖ We have the ability to adapt ourselves to a given environment
 - Seasons, climatic zones,...



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Multicomfort glass

Thermal
insulation



Emissivity, $\varepsilon = 0.01$

- ❖ $U = 1.0$ [W/m²k], for DGU
- ❖ $U = 0.5$ [W/m²k], for TGU

DGU: 4 Pst SUN – 16 Ar – 4 Plc
TGU: 4 Pst SUN – 16 Ar – 4 Plc – 16 Ar – 4 Plt XN

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Solar
protection



Solar factor, **$g = 0.38$**
Shading Coef, **SC = 0.43**

DGU: 4 Pst SUN – 16 Ar – 4 Plc

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Natural
light



Light transmittance, $LT = 72\%$
Color rendering, $Ra = 95$

DGU: 4 Pst SUN – 16 Ar – 4 Plc

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Aesthetics



Neutral aspect, both in reflexion and transmission
Low reflexion, L_{Rext} = 14%

DGU: 4 Pst SUN – 16 Ar – 4 Pst

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Acoustics



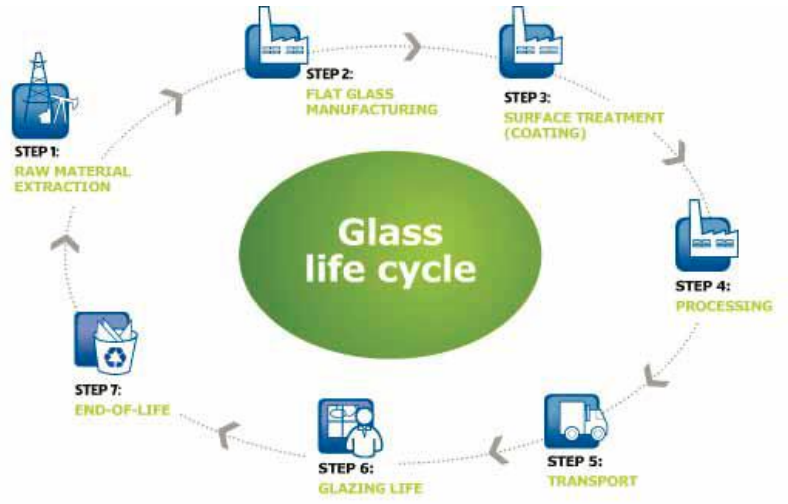
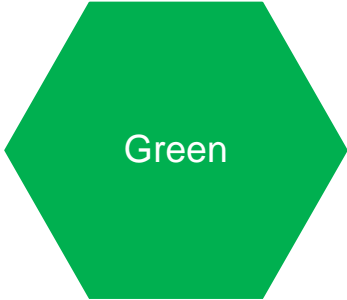
Available as Stadip® Silence xx.y Planistar® SUN

SGG PLANISTAR® SUN
Multicomfort glass

Safety &
Security



Available as:
Stadip® xx.y Planistar® SUN
Stadip® Protect xx.y Planistar® SUN

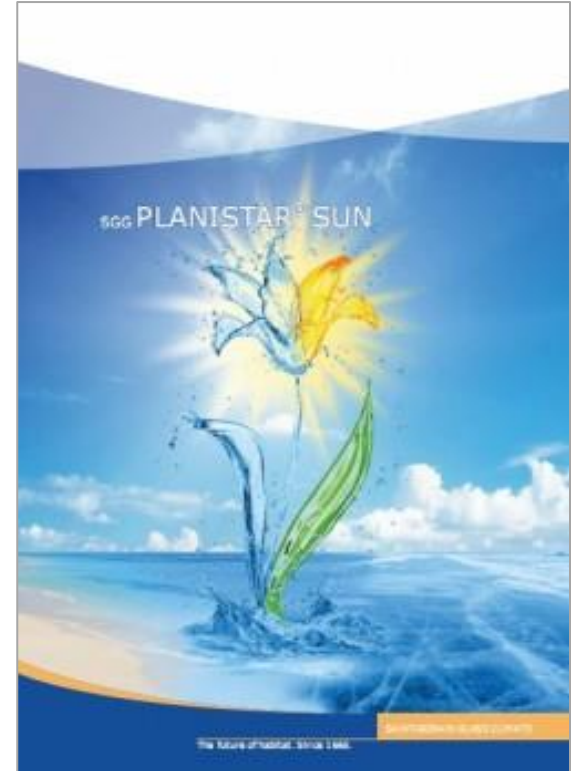
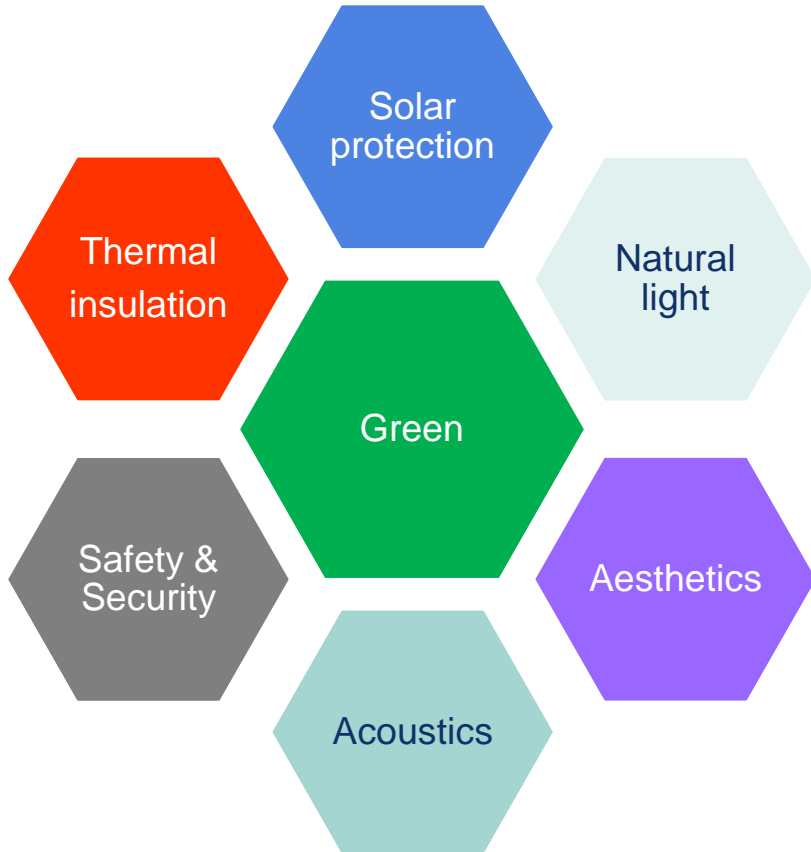


Life Cycle Assessment



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THANK YOU!