

EVALUATION OF THE COOLING POTENTIAL OF A DESICCANT COOLING SYSTEM WITH BOUNDARY LINES METHOD

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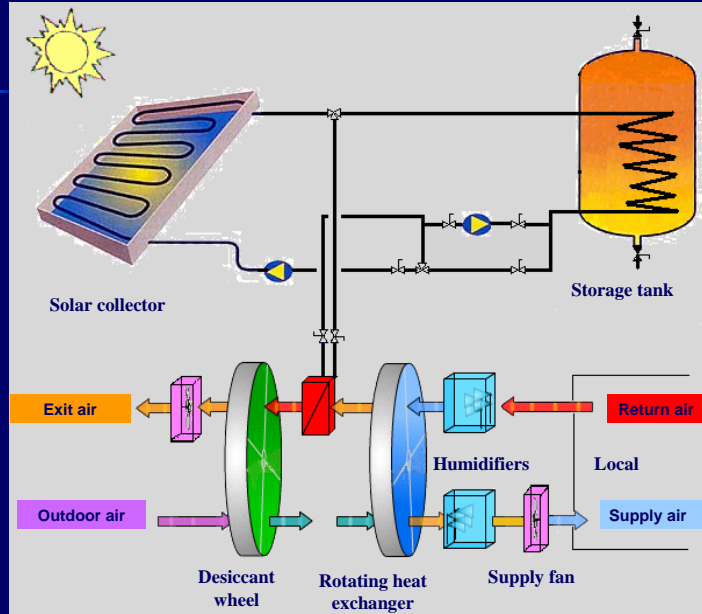
Solar cooling and summer comfort workshop
IBPSA-SFT, 25 April, Aix-Les-Bains



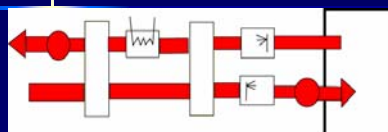
PLANNING

- **System description**
- **Boundary Lines Method**
- **Application**

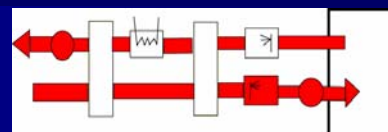
AIR AND SOLAR INSTALLATIONS



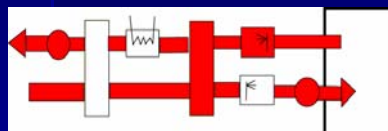
AIR SYSTEM OPERATION MODES



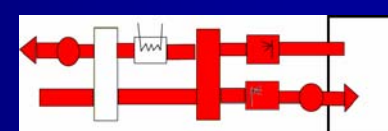
Ventilation mode



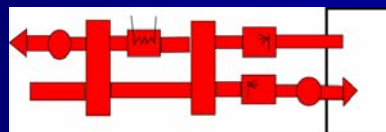
Direct humidification mode



Indirect humidification mode

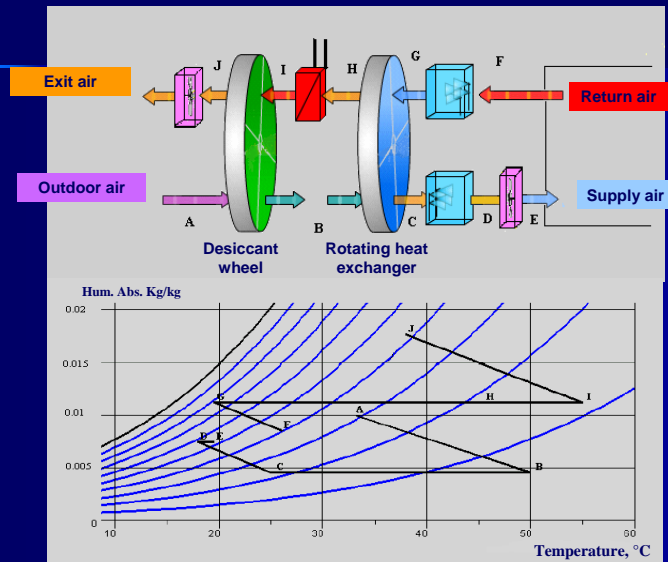


Combined humidification mode



Desiccant mode

DESICCANT COOLING MODE



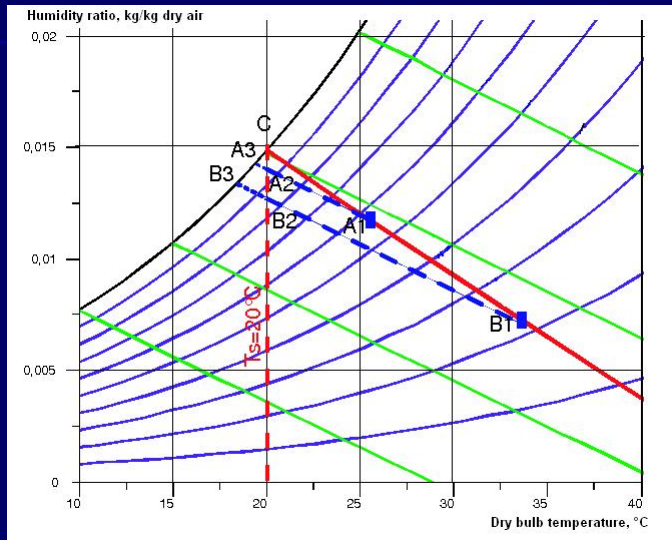
BOUNDARY LINES METHOD

Objective:
Evaluation of system cooling potential

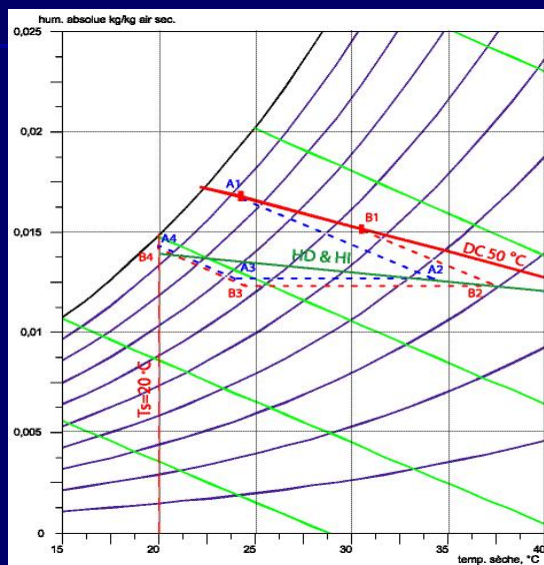
Definition:
It is the set of outdoor conditions for which supply air can be cooled to a given supply temperature and for a given operation mode.

Construction:
Using simulation (SimSPARK environment),
then, we use psychrometric chart

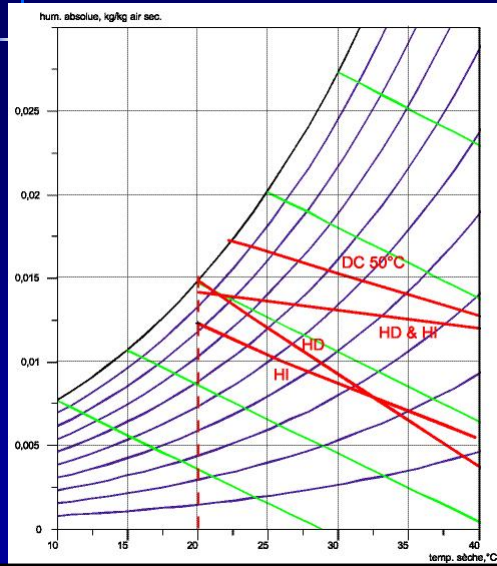
DIRECT HUMIDIFICATION BOUNDARY LINE (SUPPLY TEMPERATURE OF 20°C, HUMIDIFIER EFFICIENCY 0.9)



DESICCANT MODE BOUNDARY LINE (SUPPLY TEMPERATURE OF 20°C, $T_{reg}=50^\circ\text{C}$)



SYSTEM BOUNDARY LINES (SUPPLY T=20°C)

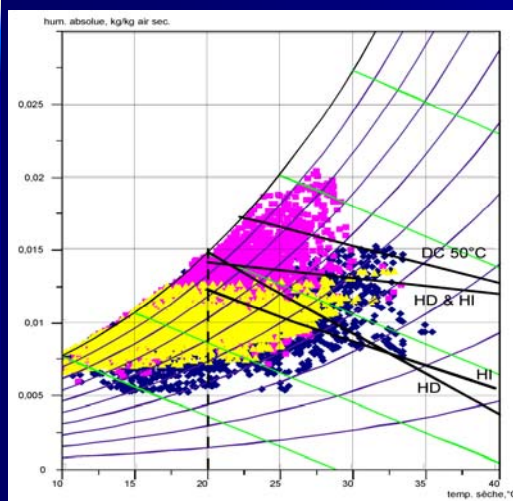


DC : desiccant mode

HD : direct humidification

HI : indirect humidification

APPLICATION



Outdoor climatic conditions for:

- Ajaccio
- Chambéry
- Carpentras

CONCLUSION

- Boundary lines method is suited to study system faisability.
- Desiccant system with Lithium Chloride solution is suited to moderate climatic regions (absolute humidity does not exceed 16g/kg dry air), evaporative systems being enough for dry regions (absolute humidity lower then 12 g/kg of dry air)