Example name: Desicant Ventilated Façade

Template completed by:
Spanish BISTS Network
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For installations

BISTS Location: Southern Mediterranean
Climate Type: Csa
Building Use: residential, commercial, offices, etc.

Level of BISTS integration: 2
x New Build
x Refurbishment
O Other:
……

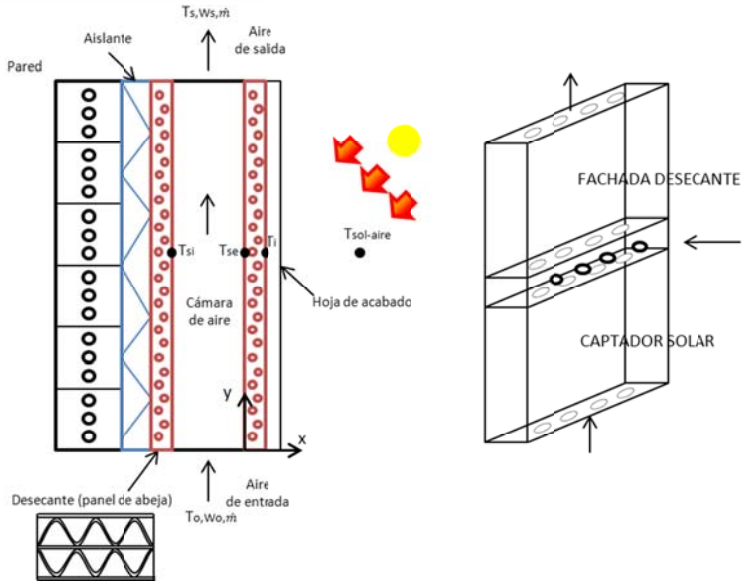
Type of BISTS:

Hybrid

Function(s):
x Air heating
O Water heating
O Combi-system
X Cooling/ventilation
x Thermal system
O linked to another system
(e.g., heat pump)
O Other

Building element:

x Facade
x Roof
O Other:



BISTS characteristics:

Modular collector area 4 m^2. Mounted preferably in south façade. Contributes to reduced ventilation load, especially latent load. It can be used to provide solar cooling if an evaporative cooling is added. A desiccant is added to a conventional ventilated façade. It can be pre-fabricated. The system must be completed with solar air collectors in the same façade.

Stage of Development: **Responsible:** University of Málaga and IAT

O	Idea/Patent	……..
x	Prototype	……..
O	Demonstration	……..
O	Integral building element	……..
O	Commercially available	……..

BISTS description and context

The system replaces the conventional desiccant wheel and proposes a new ventilated façade design, where the desiccant material is adhered. Ventilation, which flows through the air channel of the façade, contacts the desiccant material and transfer it mass and energy. Afterwards, if necessary, the air will be subjected to a treatment in a conventional air handling unit (cooling coil, evaporative cooling…) to be driven to the area. When the desiccant material must be regenerated, the solar collector of the façade system heats the outside air to the required temperature for regeneration. The design of the façade, with two columns, allows alternate absorption and expulsion modes without disrupting the air circulation.

System viability

The system viability is currently being analysed.

Modelling and simulation tools developed/used

We developed a new model for the desiccant inside the channel and coupled in TRNSYS. The model is going to be validated and improved in a pilot experience.

BISTS Performance data

Based on:
O Estimation
x Detailed simulation
Specify software(s) used
O Measurement/testing
O Long-term monitoring
tick all that apply

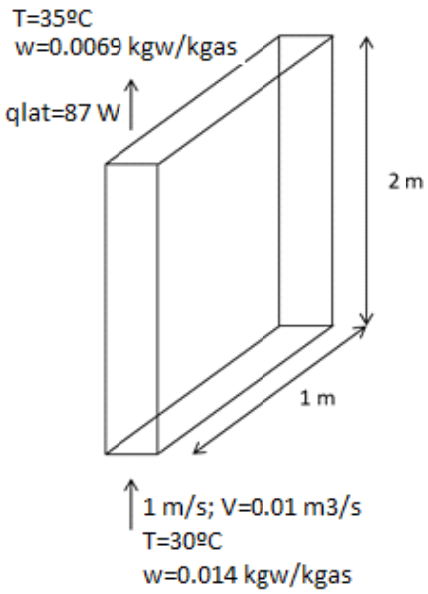
Performance parameters

For integrated systems:
key performance indicators

Latent load eliminated: 87 W

For separate collectors:
performance rating coefficients -

Other:



Additional information:

J.P. Jiménez, F. Fernández, J.M. Cejudo, MODEL OF DESICCANT VENTILATED FAÇADE FOR OUTDOOR AIR CONDITIONING VENTILATION, CLIMAMED VII. Mediterranean Congress of Climatization, Istanbul, 3-4 October, 2013

Sources and references:

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

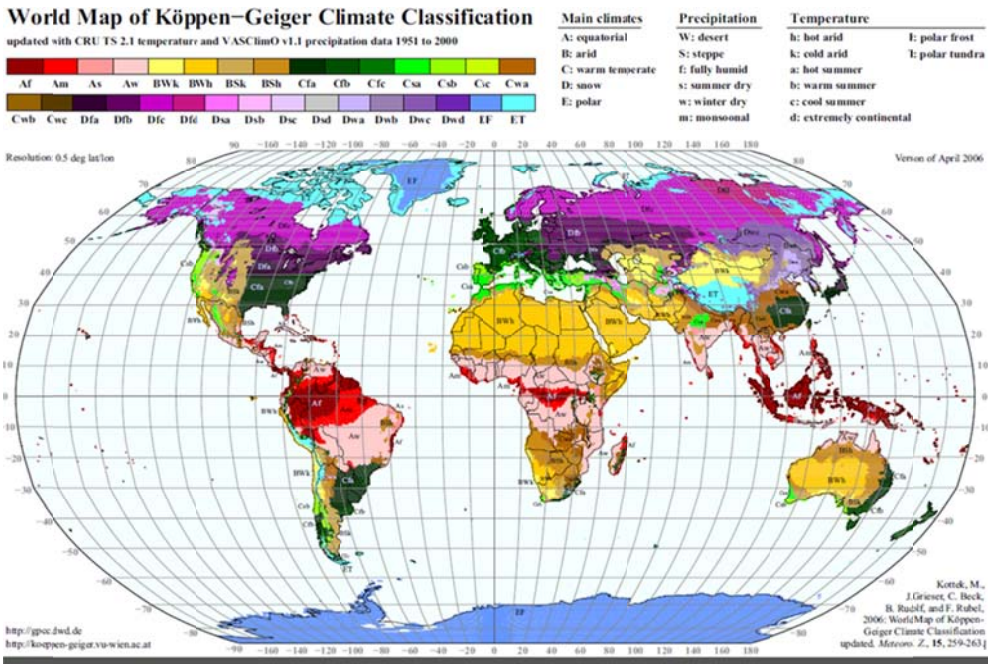
Text in red is suggested guidance. Insert information in provided space, removing red text as appropriate

If possible, use metric values.

If necessary, supply additional information on separate sheets

Reference listing

Köppen climate classification



(Kottek, M., J. Grieser, C. Beck, B. Rudolf, and F. Rubel, 2006: World Map of Köppen-Geiger Climate Classification updated. Meteorol. Z., 15, 259-263.)

Reijenga classification

The integration of PV systems in architecture can be divided into five categories:

1. Applied invisibly
2. Added to the design
3. Adding to the architectural image
4. Determining architectural image
5. Leading to new architectural concepts.

(Reijenga, TH and Kaan, HF. (2011) PV in Architecture, in Handbook of Photovoltaic Science and Engineering, Second Edition (eds A. Luque and S. Hegedus), John Wiley & Sons Ltd, Chichester, UK)

Rush classification
The architectural/visual expression of building services systems are identified as:

Level 1. Not visible, no change
Level 2. Visible, no change
Level 3. Visible, surface change
Level 4. Visible, with size or shape change
Level 5. Visible, with location or orientation change

(Rush, RD. (1986) The Building systems integration handbook Wiley, New York, USA)

Collector test standards

BS EN 12975-2 2006 ‘Thermal solar systems and components solar collectors - Part 2 test methods’
ASHRAE Standard 93-2010 ‘Methods of Testing to Determine the Thermal Performance of Solar Collectors’
ASHRAE Standard 95-1987 ‘Methods of Testing to Determine the Thermal Performance of Solar Domestic Water Heating Systems’