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BENEFITS IN TERMS OF THERMAL COMFORT, GLARE PROTECTION AND ENERGY CONSUMPTION

HALIO'S SMART-TINTING TECHNOLOGY PASSES TROPICAL TEST

A study by the BCA Sky-lab Singapore has com-

pared the electrochromic technology of Halio® glass with classic two-layer thermal insulation glazing plus mechanical sun protection. The results show that smart-

tinted glass improves user comfort and lowers energy costs while maintaining visual contact with the outside world. 100 per cent of the glare was blocked, between

17 and 25 per cent of the energy costs for the lighting was saved and over 95 per cent of the test period, a good room comfort was achieved.

Halio, a joint venture between AGC and Kinestral Technologies, develops and manufactures Halio smart-tinting technologies. The joint venture leverages the partners' respective strengths and knowledge: AGC's reputation in the building industry and 100 years of experience in glass technologies, and Kinestral's innovative, patented smart-tinting technologies.

Halio International has published the results of a full scale laboratory trial conducted by the Energy Research Institute of Nanyang University of Technology in Singapore. Halio's electrochromic glazing technology, known in the market as 'smart-tinting glass', was tested under real-world conditions at BCA Skylab, one of the world's most spectacular laboratories. "The study results prove that we can rightly call Halio technology an innovative, green solution for the buildings of the future," said Robert Jagger, Sales Manager Europe



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and Middle East at Halio International.

ROTATABLE PLATFORM ALLOWS DIFFERENT LIGHTING SCENARIOS

Two identical test rooms of the BCA Skylab, each with 43 m² floor space, are mounted on a rotatable platform on the roof of a 7-storey building. This allows technology tests under tropical conditions as well as different solar irradiation. More than 200 sensors are available for measurements.

In the Halio study, a façade with Halio glass and a façade with conventional double glazing with low-E coating plus shutters were installed next to each other in the test rooms. Both rooms mimicked the iden-

REFERENCE ROOM Low-E coated glass with closed blinds		HALIO ROOM Halio glass with automatic control
3 hours of intolerable glare, 1.25 hours of disturbing glare	Visual comfort	No glare was observed
Baseline lighting consumption	Energy savings	Cuts lighting consumption by 17% (West orientation) and 25% (North orientation)
75 – 78% of the time	Thermal comfort (PMV2 in category B per DIN ISO 7730)	95% of the time

tical office situation. The results show that Halio technology outperforms traditional low-E glasses in three areas: anti-dazzle, thermal comfort and energy savings in lighting.

VISUAL COMFORT: GLARE PROTECTION

Shots with an HDR camera that covered the complete field of view of a building user show that Halio blocks even extreme glare by 100 per cent. The test period included three

consecutive afternoons with the test façades facing west. The values recorded by the camera were converted into the DGP glare code and, according to Wienold and Christoffersen (Wienold, 2006), were classed in the four categories: imperceptible, perceptible, disturbing and intolerable glare. A total of three hours of intolerable glare and 1.25 hours of disturbing glare in the reference room would have forced

the users to lower the blinds and, thereby, also interrupt the connection with the outside world. In the test room with Halio glazing, however, no glare caused to daylight was measured during the entire three days. Even when completely dark, Halio Glass remains transparent. Since the control adjusts the tint level automatically to changes in glare intensity, the building users always have the best daylight access.

LESS ARTIFICIAL LIGHTING NECESSARY

At the same time, the improvement of visual comfort was accompanied by a reduction in energy

costs for lighting. The test room equipped with Halio glass required 17 per cent less energy when facing west, and 25 per cent less energy when facing north, compared to

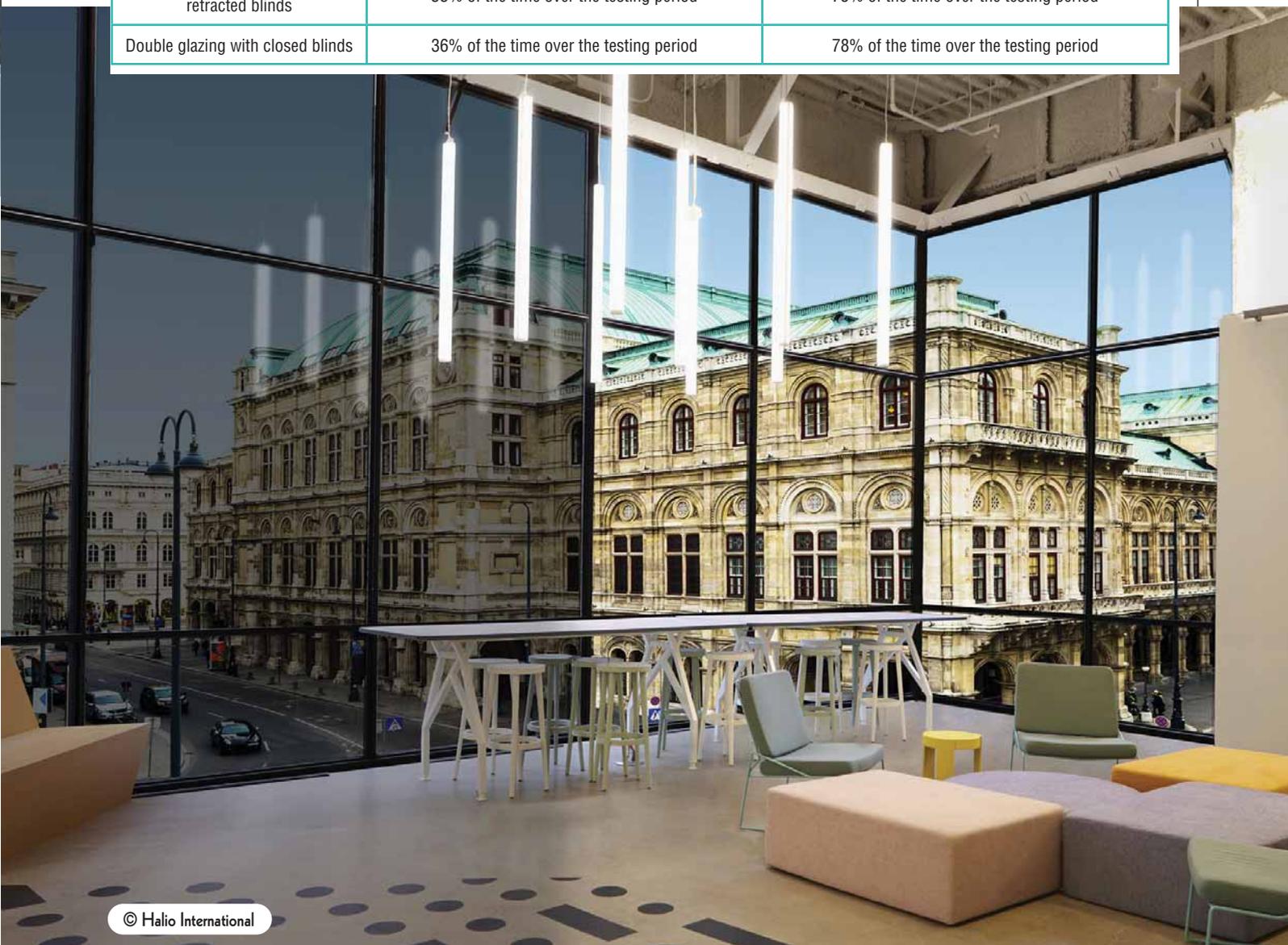
the closed-blind reference situation.

IMPROVED THERMAL COMFORT

Last but not least, the differences in thermal comfort

according to DIN EN ISO 7730 and DIN EN 15251 were also measured. In the calculation of PMV index (personal well-being) and PPD index (dissatisfaction percentage) according

	CATEGORY A Recommended for spaces occupied by very sensitive and fragile persons with special requirements (very young children, the elderly, ill persons)	CATEGORY B Suitable for most new buildings and renovations
Halio	61% of the time over the testing period	95% of the time over the testing period
Double glazing with retracted blinds	33% of the time over the testing period	75% of the time over the testing period
Double glazing with closed blinds	36% of the time over the testing period	78% of the time over the testing period

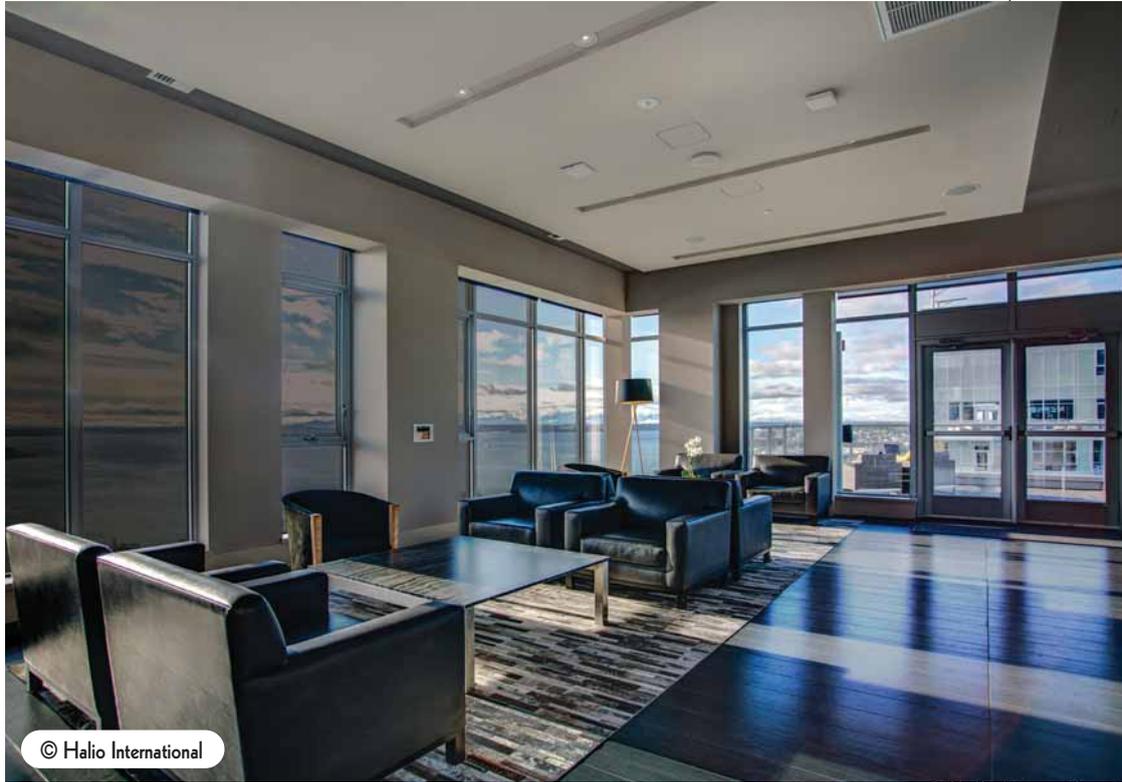


to ISO 7730, the climate parameters included room temperature, mean radiant temperature, room air humidity and indoor air velocity.

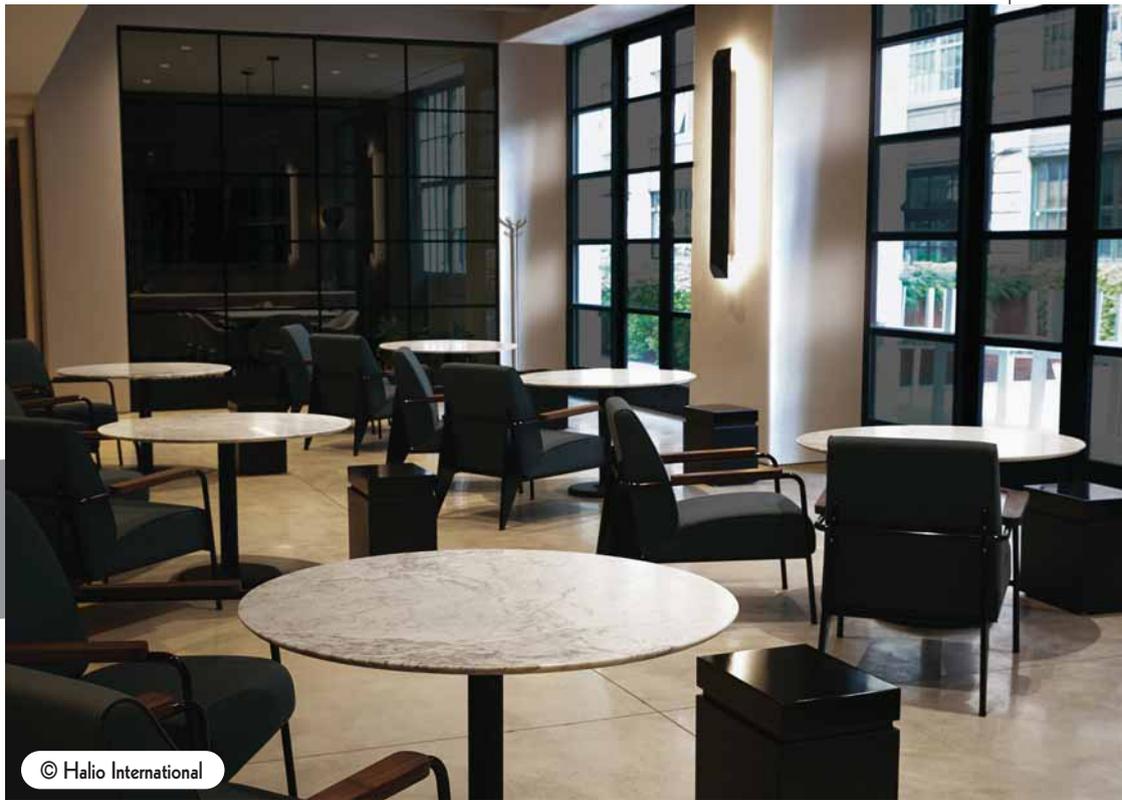
Again, the results show clear advantages of electrochromic technology. Over 95 per cent of the time, the Halio glazing test room provided a comfortable category B climate, compared to 75 to 78 per cent in the room with double-glazing and open or closed blinds. This suggests that Smart-Tinting, in addition to preventing glare, can also sustainably improve the energy input from the outside and, thus, thermal comfort.

REFERENCES

Wienold, J. C. (2006). Evaluation methods and development of a new glare prediction model for daylight environments with the use of CCD cameras. *Energy Build.* 38, pp. 743-757.



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