

Use of night blinds on multideck chiller cabinets - Potential Energy Savings

Following various tests on multideck chiller cabinets operating under a range of ambient conditions, the following guidelines have been compiled relating to energy savings anticipated by the use of night blinds during non trading hours.

For the purpose of this bulletin, three operating conditions have been evaluated:

1. Cabinet operating in climate class 3 (25C/60%RH) under full load conditions based on REC05 (The Eurovent recommendation for energy consumption evaluation of remote refrigerated display cabinets). This a universally accepted calculation for comparison purposes; however it will exaggerate the actual savings achieved in operation.
2. Cabinet operating in Climate class 3 (25C/60%RH), with refrigeration plant energy consumption based on UK climate data published in the BRA document 'guideline methods of calculating TEWI'. This condition will give a theoretical realistic maximum saving.
3. Cabinet operating in Store conditions (20C/50%RH); with refrigeration plant energy consumption based on UK climatic data published in the BRA document 'Guideline methods of calculating TEWI'. This condition will give a theoretical realistic saving.

Data is presented in the form of TEC (total energy consumption) consumed by the display cabinet and associated plant combined.

Energy consumption is representative of a typical 2.5m cabinet section.

Night blinds are assumed to be in the lowered position for 12 hrs in a 24 hr period.

FULL HEIGHT MULTIDECK CHILLER CABINET

Operating conditions						
ref	cabinet	Refrigeration plant	TEC kWh/24hr No Night blinds	TEC kWh/24hr Night blind down 12hr	TEC kWh/24hr Saving	TEC % Saving
1	25C/60%RH	REC05	41.72	33.81	7.91	18.9%
2	25C/60%RH	variable	29.22	23.80	5.42	18.5%
3	20C/50%RH	variable	22.43	18.39	4.04	18.0%

Operating conditions						
ref	cabinet	Refrigeration plant	TEC kWh/24hr No Night Blinds	TEC kWh/24hr Night blind Down12hr	TEC kWh/24hr Saving	TEC % Saving
1	25C/60%H	REC05	38.29	26.77	11.52	30.0%
2	25C/60%H	variable	26.29	18.81	7.88	29.5%
3	20C/50%H	variable	20.38	14.46	5.92	29.0%

Potential Energy Savings - continued/...

It can be seen that energy savings of around 20-30% can be achieved by the use of night blinds during non trading hours. Savings will be dependent on style of cabinet but in general savings in the order of 30% would be anticipated with semi vertical cabinets and 20% savings would be anticipated for traditional multidecks.

It should be noted that remote refrigeration plant would need to be designed to meet the refrigeration demand on the cabinet in the trading condition and therefore the fitting of night blinds does not reduce the amount of refrigeration plant that needs to be installed.

To achieve the maximum savings the refrigeration plant must also be capable of capacity control thus reducing the plant capacity to match the reduced load of the cabinet when night blinds are lowered.

This technical bulletin is for guidance only. It is based on actual testing carried out in accordance with EN441 and as stated the savings will vary dependent upon cabinet type and installation.

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NIGHT BLIND ENERGY SAVING TEST

Test conducted on a multideck chiller cabinet operating in Climate Class 3 (25-35 degrees C / 60% RH) under full load conditions. Energy consumption is representative of a 1.8m cabinet section. Manual (slow rise) blind assumed to be in the lowered position for 24 hrs during a 48 hour period.

Total Energy Consumption (48.80kWh/24 hr). No night blinds
Total Energy Consumption (k25.54Wh/24hr) Night blinds down 24 hr
Total Energy Consumption (23.26kWh/24hr) Saving
Total Energy Consumption 47.66% Saving

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