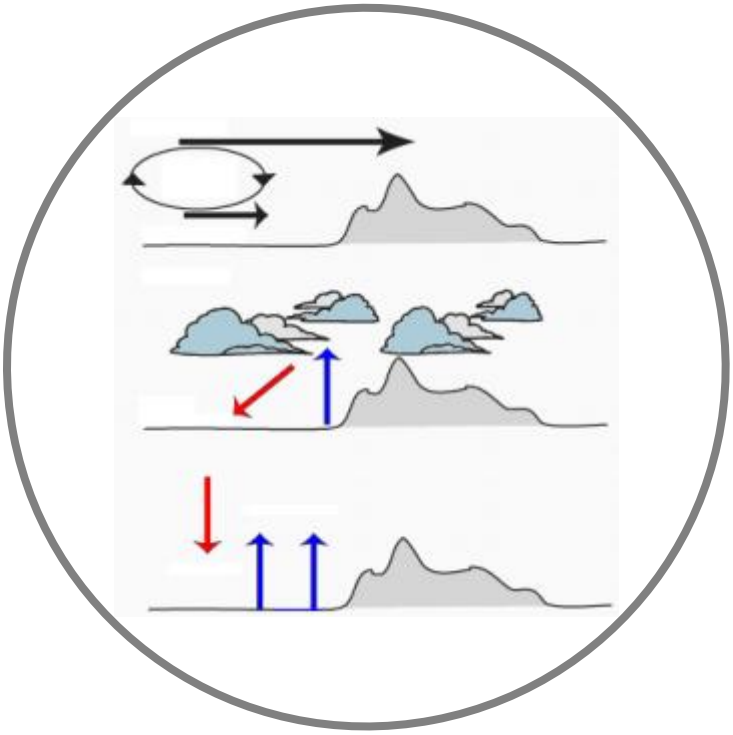
night



radiative cooling

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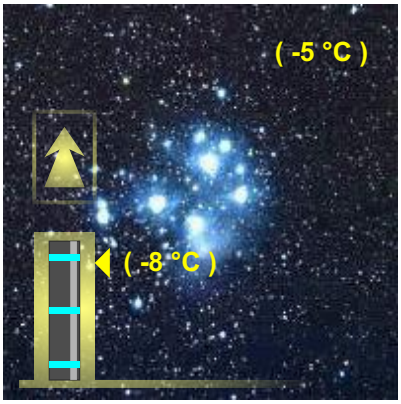


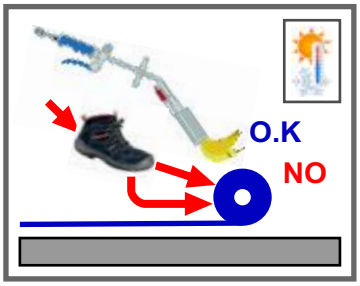
The nignt radiative cooling :
A body, in area temperature, emits thermic energy in form of different wave-length radiations. The 40% of spectrum of such emissions is concentrated between 8 and 13 μ and it is just in these wave-length limits that atmosphere presents, in particular conditions, a good transparence. More precisely the atmosphere transparence depends from the water vapor and pollution contents as well as from the zenithal angle. When the sky is cloudy or when the emitting surface is orientated towards the horizon, the atmosphere results practically opaque to the infrared. When the sky is clear and the surface is orientated towards the zenith, the atmosphere transparence can reach 80% and for wave-length between 8 and 13 μ the so named "**transparence window**" open

The transparence window :
With clear sky, because of "**transparence windows**", the thermic exchange with the cold space can achieve very relevant values, quite difficult to quantify because of the great quantity of variable data involved. The presence of clouds or an elevated value of vapor or pollution make the atmosphere opaque to the infrared and the radiant exchange is considerably reduced. The presence of a "**starlight cloudless night sky**", due to the above mentioned physical phenomena, can reduce the temperature of a roof below the level of the surrounding air, and the reason for that is not due to the cooling of atmosphere but to a severe thermic loss of the system towards the atmosphere

The condensation problems :
What we have here just described in the above paragraph can produce considerable condensation phenomena, especially in case of rainfalls in the previous days, considered by the users as losses due to an imperfect waterproofing integrity of the roofing system. The condensation results more evident in non heated buildings having air at high level of humidity : it is the case of industrial buildings just finished, in which is still present the water used in the construction

The stress factor in a waterproofing system :
The temperature variations can create serious inconvenient to the water-proof waterproofing system that, if in conditions of deformation not impeded, is submitted to elevated and consequent solicitations, which must be strictly considered in the system design and components selection phases. You have to consider that the linear dilatation coefficient of the waterproofing membranes is not constant when temperature varies. Generally its value increases at the decreasing of temperature. That means that the membrane suffers bigger dimensional variations for the same gap at different temperature (for example the contraction is bigger between -10 and -20°C than 0 and +10°C)

The superficial temperature :
The superficial temperature of a waterproofing membrane is influenced by :
---the emissivity of a waterproofing system surface (high without finishing, low with reflecting finishing);
---the insulation degree of the system
---the wind speed
---the internal temperature of the place
Experimental test : in condition of clear sky and at area temperature of - 5°C, has been noted that the temperature of polymer bitumen membrane roll open stored all night, results on the average 3÷5 °C below the surrounding air



In critical area conditions :
In case of work in critical area conditions, at temperature lower than suggested by the producers and good application practice (+5°C) it is necessary :
---to store in the working areas as few rolls as possible
---to avoid abusing the rolls when moving or transporting;
---to unroll and lay all rolls on the deck as slowly and gentle as possible, particularly in proximity of the final coils
---to warm gently all rolls with a good quality gas torch before unrolling

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