

Drying laundry by the sea

QUESTION: In the summer we often dry our laundry outdoors. It seems that somehow the clothes dry more slowly when the wind is blowing in from the sea (an onshore wind) than when it blows from inland out to sea (an offshore wind). Can this really be so?

Erik N

ANSWER: Drying is a complex thermodynamic process that involves the transfer of mass. In this case the process implies the transport of water from the wet clothes to the surrounding air. This mass transfer depends on such factors as the air humidity and the heat transfer. Both the mass transfer and the heat transfer are affected in their turn by the flow, which in this case is the wind velocity.

With an onshore wind, the air humidity is normally higher than with an offshore wind. If we assume the same temperatures of the air and of the laundry in both these cases, the difference in moisture between the wet laundry and the air will be greater with an offshore wind than with an onshore wind.

Questions should be of general interest and be about temperature measurement techniques and/or heat transfer.

QUESTIONS? ANSWERS!

This means that the mass transport in the first case is greater and therefore the laundry dries faster. The questioner's observation is correct: it is often better to dry laundry with an offshore wind than with an onshore wind.

Usually the air temperature is also higher with an offshore wind. Drying requires a lot of heat, and a higher air temperature increases the heat flow and thereby the drying speed. A higher wind velocity increases both the heat transfer and the mass transfer, and thereby the drying speed.

Wet temperature sensors

We can calculate the air humidity by measuring both the air temperature and the temperature of a damp surface from which water is evaporating. We do this with a device called a psychrometer and to do the calculations we use a Mollier diagram for moist air. The diagram shows i.a. the relationship between the air's moisture content, relative humidity, temperature, and energy content. [Ref 1]

A wet sensor for measuring air temperature will measure too low a temperature until it has dried. The drying speed depends on the flow, heat transfer and mass transfer in the same way as it does for drying laundry. The three processes involved depend on each other in what is known as a "multiphysics problem".



See www.pentronic.se > Pentronic News > Archive
[Ref 1] See Pentronic News 2009-2, p 3

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