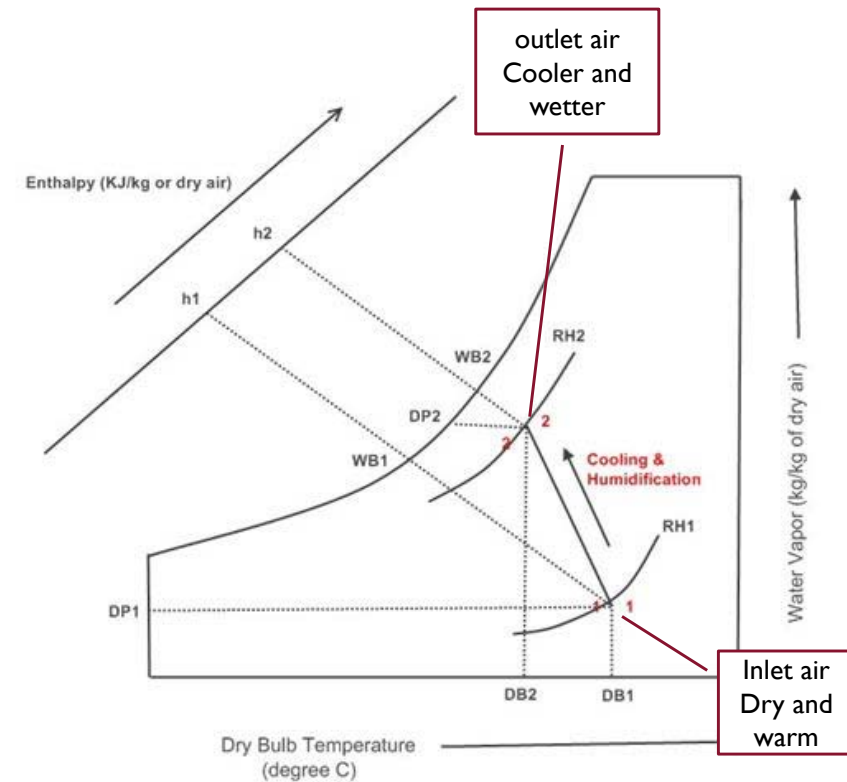


THE SCIENCE OF DRYING

PART I HOW DOES AIR DRY

- The boot has surface moisture and soaked-in moisture
- Air has built it energy (enthalpy)
- We can get the air to dry by the boot by forcing it through the boot and bringing it into direct contact with the wet surfaces
- The drying process effectively swaps sensible heat (temperature) of the air for latent heat of evaporation. , this is called adiabatic drying. This is the same mechanism as evaporative cooling .



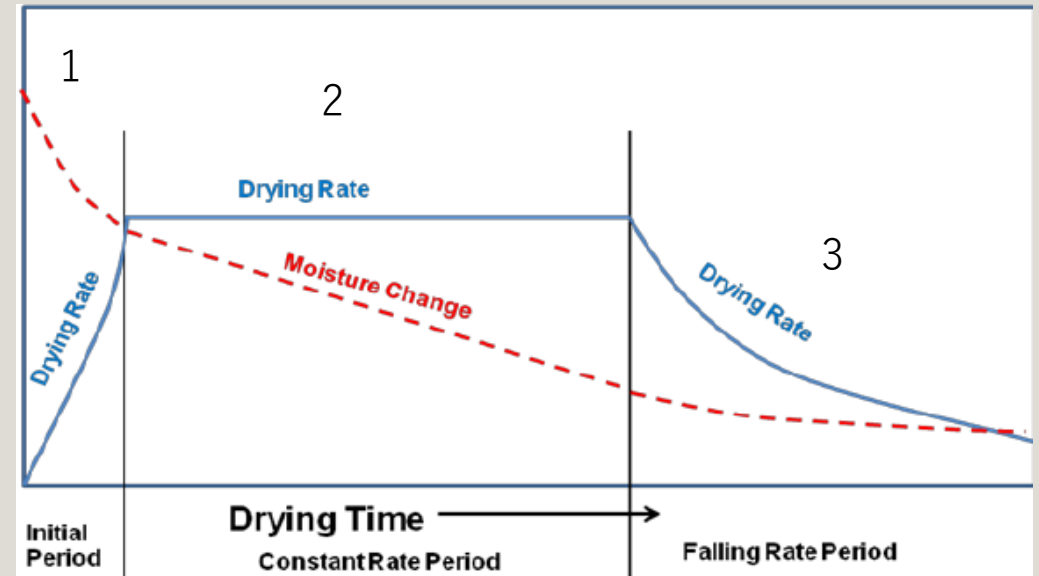
PART 2 DRYING PHASES

Phase 1 : initial period,, in our case this is not important

Phase 2 : constant rate drying. Here the moisture is freely available on the boot inner surface and the rate limit is only set by the fluid mechanics , that means the air flowrate, turbulence and the air humidity. More air means more drying, lower humidity means faster drying.

Phase 3 is falling rate

This is when the moisture has to wick from the internal structure of the boot to the surface this is diffusion limited, the dry inner surface of the boot causes a driving force to push water to the surface thus drying the whole boot. Boot materials are designed to soak moisture easily, and therefore give it back to the air easily



WHAT IS THE EFFECT OF HEATING OF DRYING RATE

- Very cold air (0degC) does a poor job of drying , but this is not normal living temperature
- 20 degree air holds 8 grams h20/kgair, this is a normal temperature for dwelling
- 40 degree air holds 24 grams h20/kgair (3x more)
- But hot air also causes distortion of delicate leather and uses energy that we haven't got available on a usb
- Conclusion : just use the heat in the air we have
- Also If you increase the air flow you will get more drying
- So room temp air will dry ok at normal humidity we don't need heaters in the boot dryers , just a normal room

