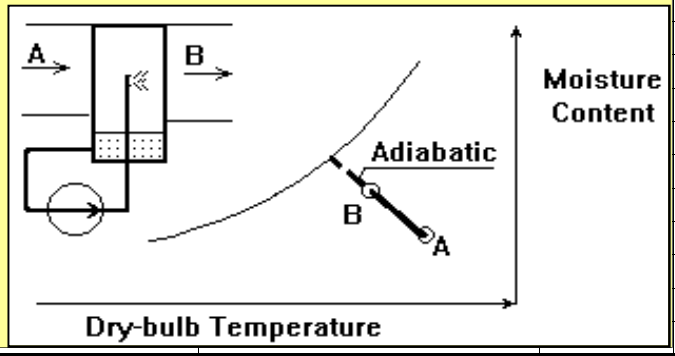
This document shows how Thermo Utilities, MS Excel Add-ins can be used for calculation of adiabatic humidification with air washer.
In an air conditioning plant, air flow rate of 2 kg/s passes through a spray water humidifier with a contact factor 0.7. Determine the moisture content and temperature of the air leaving the humidifier and the amout of make-up water needed. The dry and wet-bulb temperature of the inlet air are 25 C and 15 C respectively.



Inputs		Units
Inlet air, DBT	24.00	C
Inlet air, WBT	15.00	C
Inlet air, mass flow rate	2.00	kg/s
Contact factor of the humidifier	0.70	
Atmospheric pressure	1.01	bar

The contact factor of a humidifier is defined as the efficiency for humidification. A 100% efficient humidifier will bring the moisture content of the air to the saturation moisture content at the apparatus dew-point, mcC. The contact factor of the humidifier can be defined by the moisture content differences:

cf = (mcB - mcA)/(mcC - mcA)
or
cf = (hB - hA)/(hC - hA)

Output		
moisture content of inlet air	0.0068	
moisture content at ADP	0.0106	
moisture content of outlet air	0.0095	
make-up water req.	0.0054	kg/s
Spec. enthalpy at inlet	41.4	kJ/kg
Spec. enthalpy at ADP	42.0	kJ/kg
Spec. enthalpy at outlet	41.8	kJ/kg
Dry-bulb temp at outlet	17.70	C