

## THE THERMODYNAMIC ANALYSIS OF AQUEOUS COATING (TAAC) AND IT'S BENEFITS

A brief outline describing TAAC and how it is used follows. If you think this would be helpful to your process, you can download the TAAC program and all accompanying files from the TEI website at [www.thomaseng.com](http://www.thomaseng.com) or call us at 800-634-9910 to request a copy.

### The Aqueous Film Coating Process

1. Aqueous Film Coating is a steady-state process.
2. It takes place in a closed environment.
3. Outside air is heated and/or dehumidified.
4. Water is introduced via spray guns.
5. Cooler, more humid air is extracted from the coater.

### The TAAC Model

1. TAAC is a computer model that uses the 1<sup>st</sup> Law of Thermodynamics to characterize a film coating process based on:
  - Inlet air temperature, flow rate and humidity.
  - Spray rate and % solids content.
2. TAAC uses heat and mass transfer equations to determine the coating environment:
  - Is it relatively dry or is it wet?
  - Define the number "the Environmental Equivalency Factor (EE Factor)" that is related to coating conditions.
  - It is the ratio of heat transfer - mass transfer surface areas.
  - Higher EE is dryer, lower EE is wetter.
3. The Premise of TAAC:
  - Environmental conditions which are thermodynamically equivalent result in coatings which are equivalent. Therefore, process parameters may be varied and as long as the EE Factor remains constant, coating quality will be the same!
4. Uses for TAAC:
  - Determine a starting point for process development (an EE value of 3 - 3.6 is typical).
  - Optimize an existing process.
  - Transfer a process to a different site and/or different equipment (Scale Up).
  - Air handling systems cost/benefit analysis.
5. What TAAC does not do:
  - Cannot be used for non-steady-state processes such as sugar coating.
  - Does not apply to solvent coating.
  - Droplet size, spray patterns, gun spacing, gun-to-bed distance are not considered.
6. The Environmental Equivalency Factor:
  - The ideal EE Factor for a given product/coating material combination must be established empirically.
  - Knowing the allowable range for an EE Factor is a good thing!