Final humidity of textile drying - Results of an in-house investigation

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**Target**

- Find out the final humidity of textiles which are dried in a tumble dryer in German households
- Verify if there are significant differences between the use of humidity and time controlled dryers?
- Calculate what is the difference in energy consumption between these two cases?
- Concentrate on textiles for cupboard-dry operation

**Material and Methods**

- Two possibilities to investigate consumer behaviour were used:
  - Assess the correct feeling textiles should have at the end of the drying process by touching textiles of defined humidity at -4%, -2%, 0%, +2% and +4%.
  - Measure the final humidity of test swatches added to the load consumer dry at home
- Have 25 consumers for each method and for time controlled and humidity controlled dryers.
- Two kind of textiles were used: dish cloth and hand towel

**Background**

- Definition: Final humidity (acc. to IEC 61121):
  \[ \mu_f = \frac{W_f - W_0}{W_0} \]
- where
  - \( W_0 \) = conditioned mass of the test load (g)
  - \( W_f \) = mass of the test load after drying
- 0% final humidity means ‘dry cotton’ or ‘cup-board dry’
- Drying curve: Rather flat around 0%

**Results**

**Feeling approach**

- The average of the preferred feeling of a cupboard-dry load has a final humidity of:
  - humidity-time-controlled
    - Dish cloth: -2.0 % -1.5 %
    - Towel: -1.4 % -2.2 %
- This approach showed to be too insensitive to differentiate between time and humidity controlled dryers, as the classes of humidity chosen are 2% apart.

**Measuring approach**

- Average final humidity of
  - Humidity controlled dryers: -2.04 %
  - Time controlled dryers: -2.50 %
- Measured and assessed humidity of cupboard-dry correlate very well.
- Most frequently the assessed correct feeling is less dry than the measured humidity.
- Final humidity for ‘cup-board-dry’ loads seams to be well below 0% when tested with real load under consumer-like conditions (also for humidity controlled dryers)
- Statistics (and difference) are too small to claim a proven difference between time and humidity controlled dryers’ energy consumption in real use.
- These results are proven to be valid for Germany. Confirmation in other countries would be desirable.

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