IGASORP DELIVERS FOR BUILDING MATERIALS

Why DVS is Essential for Building Materials

DVS shows how building materials absorb and release moisture, a key driver of durability and long-term performance. By simulating real humidity conditions, DVS reveals issues such as softening, warping, and moisture-driven degradation that impact structural reliability and indoor comfort.







Critical Use Cases

- **Cementitious systems:** understand hydration state, pore structure, and durability
- **Wood:** reveal how chemical modification (e.g. acetylation) reduces swelling and rot
- **Insulation:** characterize moisture buffering properties
- **Bio-composites:** evaluate performance of sustainable alternatives



IGAsorp: Rethink DVS. Unlock Better Outcomes

Key IGAsorp Features

COMPREHENSIVE CONTROL

- Simulate end-use and stress conditions
- Wide temperature and humidity range (up to 85 °C and 98 %RH)

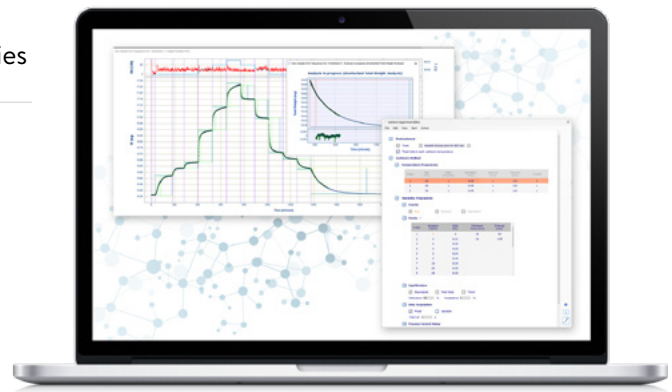
VERSATILITY

- Options for different sample types
- Flexible sample containers for different sample sizes and geometries

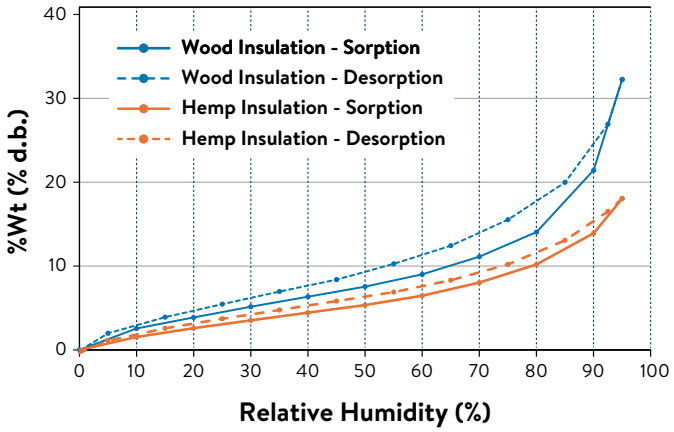
SIMPLICITY & RELIABILITY

- User-friendly software interface
- Guided workflows – load your sample, select a method and start
- Unique IGA method shortens measurements
- Engineered for reliability and longevity

IGAsorp delivers dependable moisture-sorption data for stronger, longer-lasting building materials

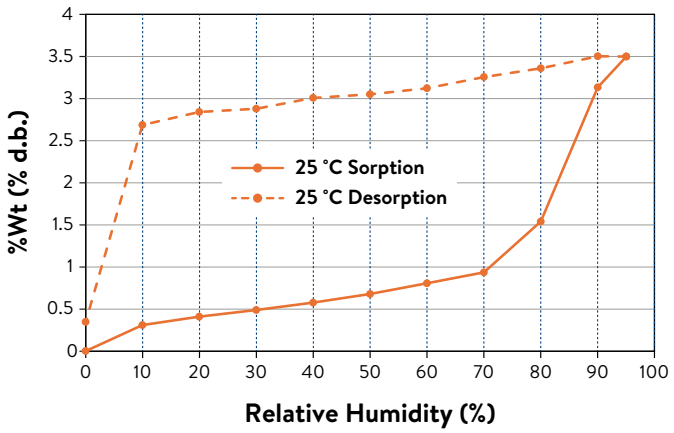


EXAMPLE DATA



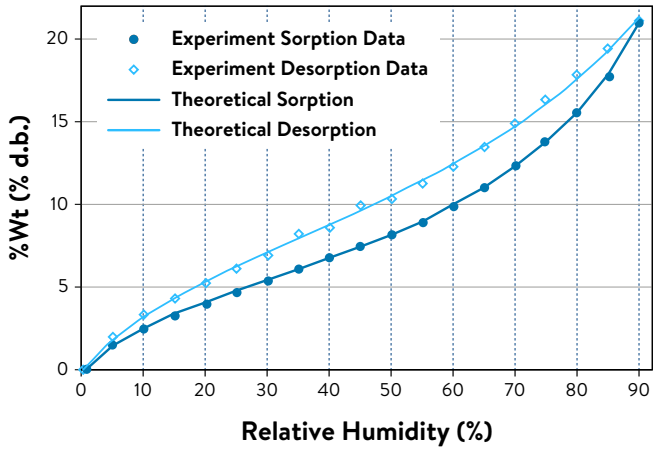
Sorption and desorption isotherms measured at 20 °C for a **wood fibre-based insulation material** and a **hemp fibre-based insulation material**.

At 95 %RH the wood fibre reaches around 30 wt% moisture uptake, while hemp fibre reaches closer to 18 wt%. Wood fibre also has a larger hysteresis loop, holding moisture for longer and drying more slowly. Hemp fibre shows smaller hysteresis and releases moisture more readily. Overall, wood fibre behaves as **a high-capacity, slow-drying buffer**, whereas hemp is a **moderate-capacity, fast-responding insulation material**.



Sorption and desorption isotherms measured at 25 °C for a **Portland cement paste sample** after 24 hours of curing.

Pronounced hysteresis is observed with substantial moisture retained during desorption until relative humidity (RH) is reduced to 0 %RH. Desorption kinetics data indicate that equilibrium was achieved or accurately predicted by the IGA asymptotic endpoint method. The observed hysteresis is consistent with established models in which water exchange with **C-S-H interlayer spaces dominates over contributions from gel and capillary pores** [1] [2]. A second sorption–desorption cycle confirmed that this behavior is repeatable and intrinsic to the material.



Sorption and desorption isotherms measured at 25 °C for a sample of **untreated Scots pine wood**. The recorded experimental data closely fit those predicted by the **Hailwood-Horrobin model**, a commonly used model in wood sorption research.

The pine sample shows significant moisture uptake (up to 20 wt%), as well as prominent hysteresis. In high humidity or intermittently wet environments, untreated woods can remain moist for extended periods of time, increasing **the risk of swelling, biological decay and mould growth**.

[1] M. B. Pinson et al. **Hysteresis from multiscale porosity: modelling water sorption and shrinkage in cement paste.** Physical Review Applied, 3 (2015), 064009.

[2] P. Schiller et al. **A model for sorption hysteresis in hardened cement paste.** Cement and Concrete Research, 123 (2019), 105770.