OAK RIDGE National Laboratory | BUILDING TECHNOLOGIES RESEARCH AND INTEGRATION CENTER

INNOVATION CROSSROADS

Hempitecture

Energy-efficient, Carbon-negative, Bio-based insulation

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Research Need

- Support manufacture/deployment of hemp insulation through thermal performance characterization.
- Raw material characterization to facilitate optimization and selection for manufacture.
- Understand moisture durability in different wall constructions across different climate zones to facilitate deployment.

Current Research

- Measured thermal performance of hemp fibers from multiple suppliers to support selection based on cost and performance.
- Heat, air and moisture (HAM) study of wall assemblies to understand performance relative to commercial cavity insulations.
- Hygrothermal simulations to understand moisture durability in code compliant wall constructions across different climate zones.

Future Research

- To characterize the thermal performance of domestically produced hemp batt insulation from recently commissioned manufacturing facility to support quality assurance efforts.
- Characterize properties of raw materials to support performance and cost optimization efforts.
- Characterize the fire performance of domestically produced hemp batt insulation for the purpose of meeting prescriptive code requirements for flame spread.

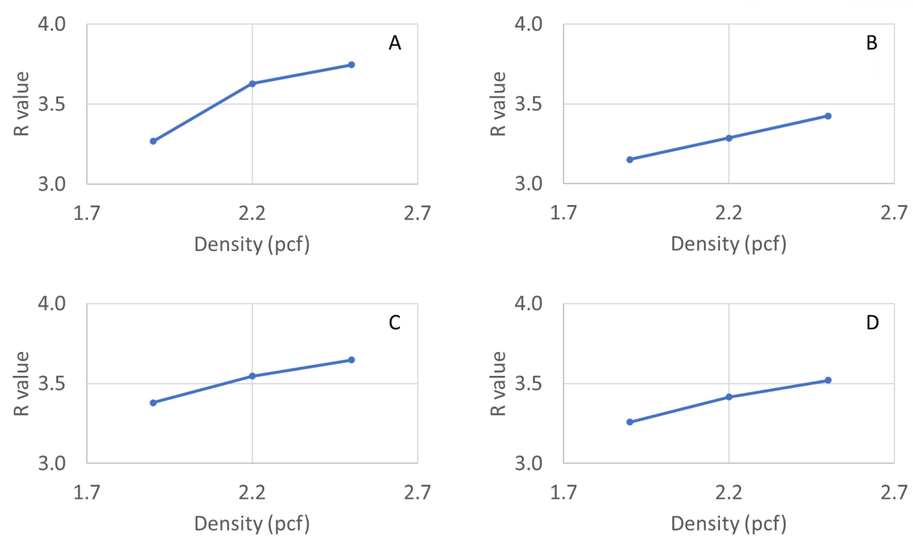

Figure 1. The thermal characterization of different hemp fiber sources as function of density.

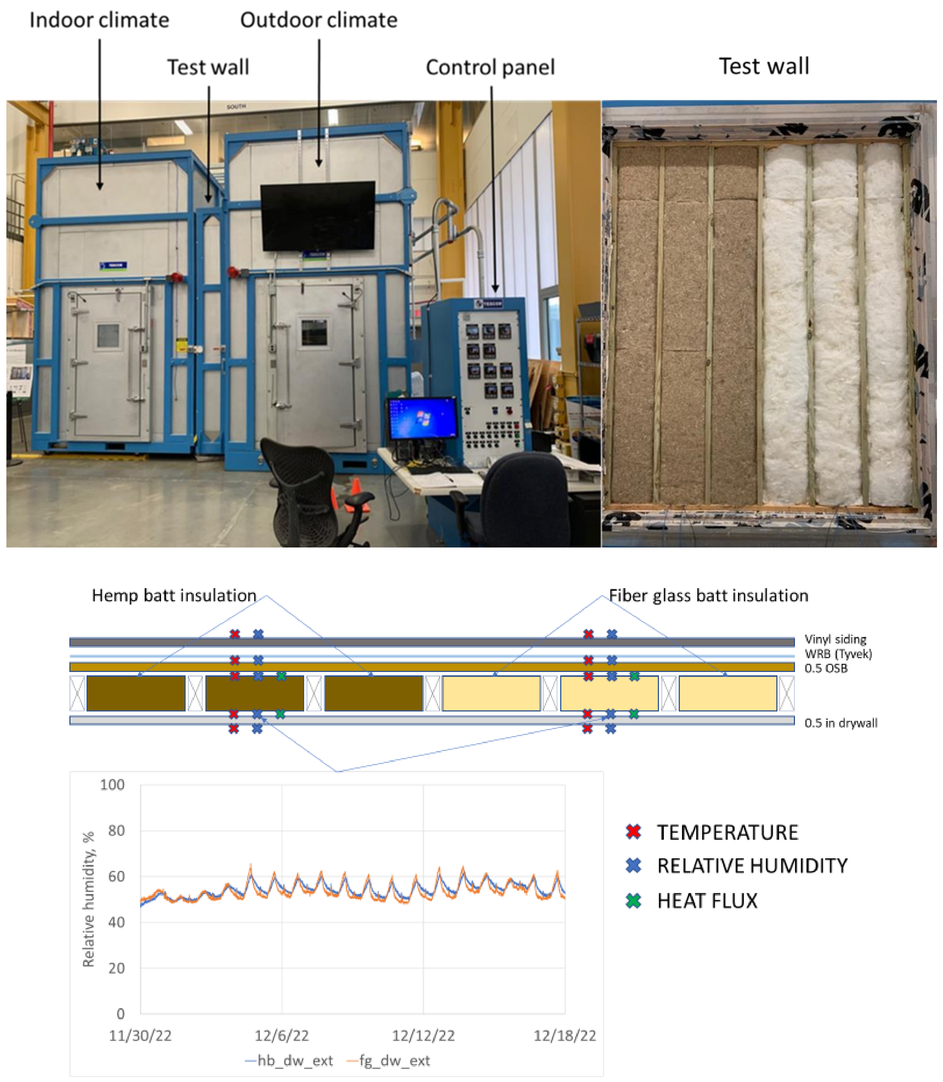

Figure 2. Large scale testing of wall construction comparing performance of hemp and fiber glass batt insulations using ORNL's heat air and moisture (HAM) chamber.



Figure 3. Recently installed & commissioned manufacturing line for hemp batt insulation, Hempitecture, Inc.