

Improved insights into the ignitability of thermal insulation

WERROWOOL OÜ provides cellulose insulation with the properties of cellulose fibre wool made of waste paper, the basic raw material. Since 2007 over 1000 sites in Estonia have been insulated with cellulose insulation provided by WERROWOOL OÜ with exports to Latvia, Lithuania, Finland, Denmark and Sweden, www.werrowool.ee



Industrial need

WERROWOOL was searching for the development opportunities of their main product – cellulose fibre wool made of recycled waste paper. The company wanted to test the product's fire safety properties and receive approved references when exporting the products. The measurements that the company was interested in, would provide the company with the information on how much heat, smoke and flaming droplets occur when a nearby object is burning time and if the product can be ignited by a bare flame. The researchers made recommendations on performing two tests for assessing the anticipated reactions.

Experiment

The measurements included the single item burning testing and the ignitability testing of the commercial thermal insulation product Ecowool by WERROWOOL.

The experimental tests were carried out according to standards EN 13823 and EN ISO 11925-2.

In EN 13823 the test was based on a fire scenario of a single burning item (SBI), where a "burning wastebasket" was located in a corner between two walls which were covered with the material to be tested. SBI test specimens were installed to fixed distance from a high power burner, providing $\sim 40\text{kW/m}^2$. Combustion gases generated during the test were collected by a hood and drawn to an exhaust duct equipped with sensors to measure temperature, light attenuation, O_2 and CO_2 mole fractions and flow-induced pressure difference in the duct. The performance of the specimen is evaluated for an exposure period of 20 minutes.

In the ignitability test EN ISO 11925-2, the specimen was subjected to direct impingement of a small flame. The test specimen is attached vertically on a U-shaped specimen holder. A propane gas flame was brought into contact with

the specimen. Filter paper was placed beneath the specimen holder to monitor the falling of flaming debris. Filter paper is placed beneath the specimen holder to monitor the falling of flaming debris. In both tests, the cellulose fibre wool made of recycled waste paper was used as material.

Findings and valuable implications

The main finding was that with proper additions the cellulose fibre wool had really low reaction to fire and can be used quite safely in thermal insulation of constructions. The flame did not spread across 150mm vertically during EVS-EN ISO 11925-2:2010 ignitability testing. The smoke growth rate index did not reach the threshold at all, so this product did not produce a lot of smoke at all. There were no flaming droplets coming from the fire either. Implication was that the company could determine the safest composition for their Ecowool product and apply the new knowledge by achieving the competitive advantage at the thermal insulation market. The measurements enabled the company to determine the most fire-retardant material composition for their product and make it safer. The findings of the experiment allowed the company to secure a

much demanded reference when exporting their products. Additionally, the conducted tests provided WERROWOOL with an actual EuroClass value for the product, which can be used in marketing throughout Europe, thus expanding the company's export potential beyond its home market in Scandinavia and the Baltic region.



The image of cellulose fibre wool for thermal insulation

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