

ISOCELL



Cellulose Ingredients Composition Disposal

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Cellulose

Insulation material made from recycled paper

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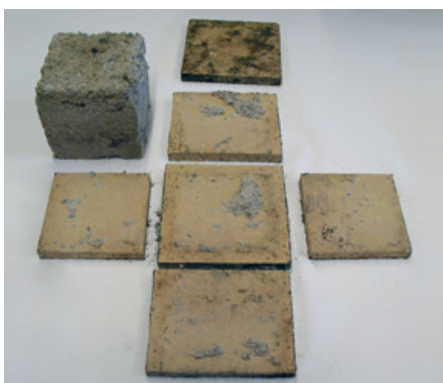
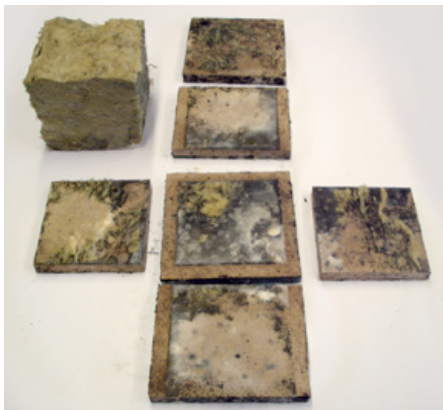
ISOCELL cellulose consists of more than ninety percent recycled paper. The raw material used is clean, single-grade newspaper. The main countries of origin for the Belgian plant are Germany, Belgium, Luxembourg and France, while for the Austrian plant they are Austria, Germany, Italy and the Czech Republic. As proven mineral fire-protection salts, ISOCELL uses boric acid and magnesium sulphate. ISOCELL EVOLUTION uses magnesium sulphate exclusively. Today's newspaper becomes tomorrow's insulation material. The basic raw material is wood, a renewable resource with a very small ecological footprint. By using the material efficiently – first as newspaper and then as insulation – the ecological footprint is reduced even further.

Fire protection

The fire-protection salts mentioned above release crystal water when heated – this release of water removes energy from the flame and slows down flame spread. In appropriate timber constructions, ISOCELL cellulose therefore achieves a high level of fire protection – up to REI 90. The added boron also has a flame-retardant effect. During combustion it forms a ceramic layer that further slows down the progression of fire. In addition, boron has a mould-inhibiting effect and protects the structure in case of water ingress. Experiments have shown that fully installed ISOCELL cellulose can protect wood-based materials even when they are exposed to extraordinary moisture loads.



Protection of contact surfaces



Particleboard cubes: rock wool insulation on top and cellulose insulation below, 30 days after moisture exposure / Source: "Mould growth on wood and wood-based materials", Michael Gomm; FH Kärnten, diploma thesis

Durability

ISOCELL cellulose does not suffer from fatigue effects. In addition to its excellent thermal insulation performance, ISOCELL cellulose stands out particularly for its precise fit and long-term resistance to settling.

Even after decades: a perfect fit and settlement resistance just like on the first day. For 21 years, the prefabricated house built in timber-frame construction and insulated with ISOCELL cellulose by the company Pronaturhaus provided valuable service in the "Blaue Lagune" model home park in Wiener Neustadt. In 2013 it was dismantled so that, after reconstruction, it could begin its second life as a "real" residential home in a village about 30 kilometres away. When the show house was dismantled, impressive proof of the reliability and durability of the blown-in insulation material became evident. The cellulose installed in the exterior and partition walls showed no signs of settlement, deformation or any other loss of quality even after more than two decades of use. Josef Schedelmayer, partner of Pronaturhaus Obritzberger GmbH from Gösing, was enthusiastic: "In every respect, the cellulose insula-

tion looked as if it had just been blown in. That is impressive when you consider how other insulation materials often look after only a few years." Another example of the durability and dimensional stability of ISOCELL cellulose was observed during the attic conversion of a single-family house in Tyrol in spring 2014 that had been insulated 17 years earlier. Here too, the workers found an intact, seamless insulation layer.



After 17 years with the roof structure opened: ISOCELL cellulose appears as if freshly blown in – no signs of settlement or deformation.

BORON

Boron is a component of the plant cell wall.

**Boron is important for cell division and cell elongation.
A deficiency of boron leads to reduced plant growth.**

Boron in plants and in soil

Although the first documented use of borates dates back to the 8th century AD, humanity has unknowingly relied on borates since the beginning of agriculture almost 10,000 years ago. Plants cannot live without boron. Boron is an essential micronutrient in the life cycle of plants. Only small amounts are required, but it is necessary for regulating flowering, pollen production, germination and the development of seeds and fruits.

It also acts like a fuel pump, facilitating the transfer of sugars from older leaves to new growth areas and root systems. Although boron is present in all soil types, there are regions where heavy rainfall, geological conditions or agricultural practices have leached boron from the soil, leaving too little for the survival of plants, crops and fruit trees.

It is therefore not surprising that fertilizers are among the main products formulated with borates. Fertilizers containing borates have proven effective in increasing productivity in areas where natural borate levels in the soil are low. Some field and tree crops also require relatively high boron supplementation, such as cotton, maize, alfalfa and soybeans.

Boron in food

Plants absorb borates from the soil, which are then distributed through stems, leaves, roots and other plant structures. When people eat plant-based foods—such as fruit, vegetables, nuts and legumes—they routinely ingest small amounts of boron. Studies have shown that people in different cultures consume approximately one to three milligrams of boron per day through a combination of food and drinking water in their diets. Although it has not yet been proven that humans need boron to live, the scientific community worldwide—including the World Health Organization (WHO)—agrees that boron is an important nutrient for maintaining optimal human health.

Most of us probably consume a healthy amount of boron every day through our normal intake of fruit and vegetables. If not, many beverages—including coffee, wine and beer—also contribute. Our bodies are very familiar with boron in our environment. They regulate our daily intake efficiently, taking what they need and excreting the rest. Regardless of the source of boron, our bodies treat ingested or inhaled boron just like any other nutrient.



Video



Video field trial: Charcoal from cellulose insulation used as a micronutrient fertilizer for maize and as a slurry improver

ISOCELL cellulose is produced from recycled paper. The cellulose fibers originating from trees are usually recycled several times as newspaper before being processed into insulation material. When these old newspapers are then turned into cellulose insulation, they can also be used several times. The insulation can be removed and reinstalled up to four times before the processing begins to noticeably affect the fiber quality. When disposal eventually becomes necessary, the research project “Charcoal fertilizer from cellulose insulation” demonstrated that carbonizing the insulation material can create a valuable soil nutrient for plants. In particular, the boron contained in the material is absorbed by plants as an important nutrient and promotes growth. The CO₂ is permanently bound and stored in the charcoal.

Storage

ISOCELL cellulose

New material packaged with an intact original pallet cover may be exposed to weather conditions for a short period of time. However, long-term outdoor storage is not recommended, as damage to the packaging may lead to moisture absorption by the insulation material. Material that is no longer in its original pallet packaging (both new and used) must be stored in a dry place and protected from wind dispersion.

Recycling or disposal

Hierarchy of possible measures:

1. Reuse if possible

ISOCELL cellulose can be reused as insulation 3–4 times before the fiber structure noticeably degrades. The material can be extracted by suction and reused as insulation. Flakes that are 100% free of contaminants can be blown in again (all applications possible). If minor contamination is present, it is recommended to fill the material into bags and use it as loose-fill insulation on top-floor ceilings (otherwise there is a risk of machine damage during mechanical processing due to impurities in the cellulose flakes).



2. Return to the manufacturer – recycling

In cooperation with Prof. Dr. Konrad Steiner and the HBLA Ursprung school, a joint research project succeeded in closing the material loop. After its use as thermal insulation, the material is carbonized and, thanks to the borates it contains, applied to fields as a valuable fertilizer. In this way, CO₂ is permanently bound. The carbon is permanently stored through the carbonization process. Boron is an important nutrient required by plants. Due to the currently low return volumes, there is not yet a nationwide infrastructure, and carbonization is presently carried out only in pilot operations at the manufacturer. Once the return volumes increase, the already well-developed system can be activated. After consultation with the relevant paper mills or collection facilities, returning the material to the paper recycling cycle is also possible.



3. Disposal

If cellulose insulation needs to be disposed of, this is handled by local waste management companies. The waste code is listed on the right. Disposal via household waste landfills is not permitted for legal waste-management reasons. This also applies to ordinary newspaper, as the proportion of organic materials in landfill waste is strictly limited in order to preserve landfill capacity and prevent the formation of climate-damaging gases during decomposition. In most cases, the material is incinerated in waste incineration plants. Disposal costs vary greatly depending on the receiving facility but are significantly lower than those for inorganic insulation materials that must be permanently landfilled.

Austria:
Waste code
18718 77 g

European Waste
Catalogue (EWC):
Code 17 06 03*

If the material is not contaminated with foreign substances, it can be returned to the manufacturer. Incineration in a suitable waste incineration plant, either as a mono-batch or together with other municipal waste, is permitted.

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