▲Above: The Visé site with production for Knauf Insulation in the centre and the extension building for Resulation on the left.

Converting construction waste into glass wool

Knauf Insulation has successfully launched an environmental project which recycles construction waste into raw materials for the production of glass wool. Jean Hardy* met with staff from Knauf's Visé, Belgium site to discuss the project and its future aims.

We can no longer imagine constructing a new building without efficient thermal insulation. For several decades, glass wool has been and will continue to be one of the most high-performance solutions.

Many antiquated buildings are currently being refitted: for residential houses, the existing insulation is generally replaced, but for bigger projects, this can go as far as the complete demolition of the building which creates a lot of waste.

An initially underestimated problem has emerged in recent years: what to do with the glass wool after the destruction of a building?

As long as the resulting waste after demolition was limited, the solution was to landfill it without sorting, so everything was discarded together: concrete, bricks, wood, and glass wool.

But today waste legislation is more severe in some European countries with regards to landfill. There is less landfill capacity, higher landfilling prices and in some places landfill is banned outright.

Two years ago Knauf Insulation launched a glass wool waste treatment project at its Visé site in the north-east of Belgium, close to the borders with Germany and The Netherlands.

The Resulation project is pioneering in its waste treatment of the glass wool generated by deconstruction, but also by new construction and from production.

All the waste is transformed into a secondary raw material that can then be part of the traditional mixing batch, i.e a fresh raw material plus cullet which originates from cleaned waste of flat glass or glass bottles.

Knauf's Business Development Manager, Thomas Baguette, said the motivation to launch Resulation was two-fold, one from a political-economic environment and the other was company strategy. He said: "It is not acceptable to have more than 80% of waste in the long term simply going to landfill.

"From a management perspective, the target is to find an alternative source for our cullet, taking in account the specificities of our batch that includes some chemicals elements as bore and other 'exotic' components.

"Thanks to the circular economy both approaches are closely related. Less waste sent to landfill will generate more secondary raw materials for us and reduce our use of primary raw materials."

Production Manager Guilhem Galandrin explained the process that is split in six phases:

1. Reception and quality control of the waste to be used. Welcomed: any glass wool, independently from the producer, naked, in panels, with paper kraft or aluminium coating. Not welcomed: plaster boards, stone wool, wood, tiles, waterproof membranes, metals, or demolition waste
2. Fine milling (micronisation). Purpose: to standardise the size of the particles and also to increase the density of the materials to be treated.
3. Melting: the heart of the process.
4. Quenching of molten glass: transformation of glass to microbeads, thanks to a high flow of counter-current water.
5. Obtain the cullet by grinding the microbeads.
6. Production of the 'new' glass wool.

He added: "The last phase (phase 6) is part of our classical process. In fact, on the existing production lines, we mix together fresh raw materials, cullet from traditional waste glass recovery and finally cullet from the Resulation process. The Resulation cullet does not generally exceed 5% of the total batch.

Challenges

Construction waste treatment, despite inert waste treatment, is not yet common practice everywhere.

Raw material before treatment.

Resulation cullet after it has been treated.

In some countries and regions, landfilling or incineration remains a cheap option because of the attractive cost towards recycling solutions. Given the proximity of the borders with the Visé site, the facility has to follow the evolution of rules and laws of every neighbouring country.

Whatever the rules are on a legal point of view, a more efficient waste treatment system must be put in place.

"We are well aware that, given the low density of glass wool, our waste takes up a lot of space on demolition sites. So we work closely with waste collectors to speed up the process, from the source of the waste to its receipt on our site."

"The fact is that there is not only the logistic to put in place but, above all, to change the mindsets regarding deconstruction of old buildings and raise awareness of the parties involved in the waste collection that are brought back from various places to our recycling facilities.

"This takes us a lot of time and energy."

Cullet

So far, given the low quantities produced (a few thousand tonnes, after 1.5 years of processing), the cullet has covered the site's internal needs. The situation has

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He added that the Visé site has several advantages. It is a European hub for the production of glass wool with output of 130,000 tonnes/year. This equates to more than 5 million m^3, corresponding to thermal insulation of 50,000 single-family homes.

The location is in the heart of the Meuse-Rhine Euroregio with direct access to the Benelux, German and French markets. It is in the centre of the Liège-Aachen-Maastricht triangle, next to a railway and road transport network as well as the Meuse river.

The Visé site also has plenty of experience in the management of Environmental Projects. For example, it successfully developed ECOSE, a bio-based formaldehyde-free binder technology.

been suitable so far because it allows the facility to improve its internal process.

Still in its early stages, the next step is to put a supply chain in place to collect and transport the glass mineral wool to be recycled and to convince customers to recycle it.

If Resulation's production were to increase substantially, it could consider selling its cullet first to other Knauf Insulation sites, then to any other player involved in the glass wool sector.

There is also the treatment of waste linked to the current production to consider. These are about 2% of losses, generated by the transition time between the finished products and various adjustments.

This waste can also be treated by the Resulation process as long as it is not polluted by various facing or claddings, such as paper and aluminium.

One question about the project is its profitability. It required an investment of €15 million – not including production and maintenance costs – to produce a few thousand tonnes of cullet a year does not see attractive.

Managing Director, Olivier Douxchamps, states that the answer is more balanced.

"First, it is too early to decide on the rentability of the Resulation project because it is still under development. Shareholders asked to the Visé plant will develop a prototype which could later be extended to other Knauf Insulation sites, providing a full integration of the logistics between the sites.

"Moreover, taking in account the country of delivery of Resulation's cullet as well as the cost of landfilling, the answer has to be nuanced.

"So, the question is not to know if the process is profitable or not but, when it will be, and where. Indeed, the Resulation project allows us to be ready for the future of the recycling of glass mineral wool. We won't have a choice." ■

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The Visé facility also produces Knauf Insulation materials.