

## Manufacturing

Europe is the world's second largest steel producer with an average annual production of 170 million tonnes across 500 production sites. Approximately half of this production is made via Electric Arc Furnaces which generate 10-20 kg of EAFD per tonne of steel produced. Untreated, this dust is considered a hazardous waste and the handling costs for the estimated 1.3 million tonnes Europe produces annually is over €100 million per year for EU steelmakers.

**What if these EAFD costs could effectively be eliminated and a value added product produced instead?**

Using a Spanish patent, REWASTE recycles EAFD into a shape stabilized acoustic insulation with thermal inertia provided by embedded phase change materials (PCM). The material is non-hazardous, flexible, durable, highly dense, and offers compelling value for the product cost at the same time it solves the environmental challenges associated with treating EAFD.

**Did you know, in some countries public construction works are mandated to use up to 30% of materials that contain recycled elements?**

The output of the EU co-funded project REWASTE is the industrial validation, market deployment and replication of a developed technology for recycling steelmaking wastes and manufacturing multifunctional building products. Constructive solutions using the new material are developed and tested.

The material itself is produced by partner Trimdelson Trade S.L. near Barcelona who have optimized manufacturing process parameters at industrial scale. The resultant mats can be customized and produced at various thicknesses (typically 3-5mm) and at various widths (typically between 0.5-1.2m) to include being affixed to other construction materials to form integrated multifunctional products.

Local production is a project goal and it is a competitive advantage to select REWASTE recycling because there are only a few recycling centres in Europe capable of handling EAFD. As such, steel makers are currently required to transport EAFD across multiple EU countries to recycling facilities.

## Project Partners



[www.eurecat.org](http://www.eurecat.org)

EURECAT is the major private RTO in Catalonia and 2nd in Southern Europe. It provides unique technology and advanced knowledge to industry in order to solve its needs for innovation and empower competitiveness. Eurecat brings its expertise on industrial sustainability and manufacturing scalability.



[www.ub.edu/diopma](http://www.ub.edu/diopma)

The Universitat de Barcelona is a co-patent holder of the REWASTE technology, and it brings to the consortium key knowledge with regards to chemical, environment, recycling and production.



[www.grea.udl.cat](http://www.grea.udl.cat)

Universitat de Lleida is a REWASTE co-patent holder Public University that combines its success as a long-standing university with a young and dynamic structure that is committed to high quality training based on advanced methods.



[www.nobatek.com](http://www.nobatek.com)

Nobatek brings the consortium its expertise on sustainable construction. It will help pave the way to market for REWASTE as a building material, taking into account key aspects concerning sustainability in building products.



[www.r2msolution.com](http://www.r2msolution.com)

R2M serves as the project exploitation manager. As such, R2M conducts market analysis, constructs business models, and prepares REWASTE for market launch. Post project, R2M will manufacture and sell REWASTE in Italy.



[www.trimdelson.com](http://www.trimdelson.com)

TRIMDELSON, as a production manager will be the REWASTE key beneficiary. TRIM will be responsible for managing EAFD as raw material, and also producing REWASTE products at commercial scale in a standardized and replicable industrial methodology.



[www.fcc.es](http://www.fcc.es)

FCC as an EU-major building company and end user of REWASTE products, has a privileged situation to conduct REWASTE to a rapid market entry, by tailoring the production of REWASTE products according to the needs of a major end user.



[www.bre.co.uk](http://www.bre.co.uk)

BRE is UK's leading centre for research and consultancy on construction quality, environmental impact of construction, sustainability and whole-life performance, energy efficiency and renewable energy.



[www.rewastee.eu](http://www.rewastee.eu)

**Developing High Performance Thermo-Acoustic Construction Products** (using recycled content) - including the world's first flexible acoustic membrane with phase change material



ECO/13/630286

Co-funded by the Eco-innovation Initiative of the European Union



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## What is REWASTE?

### Recycling steel making solid wastes for added value energy efficiency building products

**REWASTE** delivers to the sustainable construction market, a unique and specialist flexible membrane, manufactured from recycled content, for acoustic insulation (REWASTE) and the world's first flexible acoustic membrane incorporating phase change materials (PCM) (REWASTE plus) which provides thermal buffering.

Products:

- **REWASTE**: a rubber-like flexible mat with a high surface density (approx. 7kg per m<sup>2</sup>). Ideal for use as acoustic insulation.
- **REWASTE plus**: has many of the sound insulation properties of REWASTE but also provides thermal inertia via Phase Change Material.

**REWASTE** recycles Electric Arc Furnace Dust (EAFD) – transforming it with a patented process into a usable building product for construction applications. What is unique about REWASTE is the integration of phase change materials into the recycled material resulting in a product with high thermal inertia.

The product has been designed and tested for specific construction product applications such as:

- sound insulation panels,
- multilayer wall partitions,
- underflooring,
- flexible membrane for insulation purposes

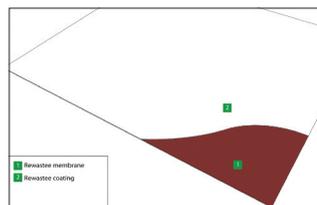
and other applications where either thermal inertia and/or acoustic insulation is needed.

**With 70% recycled content, using REWASTE can bring additional thermal and acoustic comfort, help gain LEED credits, increase BREEAM scores and/or meet regulatory requirements.**

## REWASTE Applications

REWASTE membranes can be delivered as a simple product, or can be part of different constructive solutions. Solutions using the REWASTE membrane (or complex layers) can be tuned according to user and market needs. The membrane can be used vertically or horizontally and can be packed and delivered in rolls or in sheet layers.

### Membrane Layers

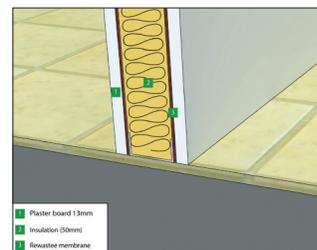


The REWASTE membrane is the first product developed in the project and is the base for other products.

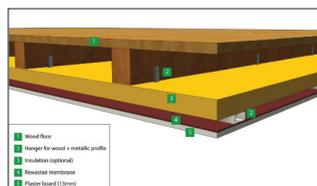
To facilitate implementation, a REWASTE membrane with an adhesive surface and thin plastic film (for protection) is proposed.

The REWASTE membrane is implemented between the metallic frame and the interior plasterboard (or wood panel), in each side of the partition wall. The metallic frame is directly fixed on floor.

### Walls

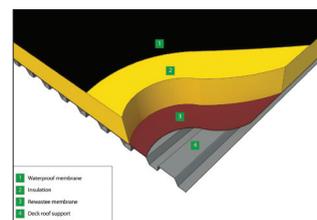


### Floors



The REWASTE membrane is placed between the flooring and a thin acoustic layer. Fixings are dependent on the flooring materials used.

### Roof - Decked Roof



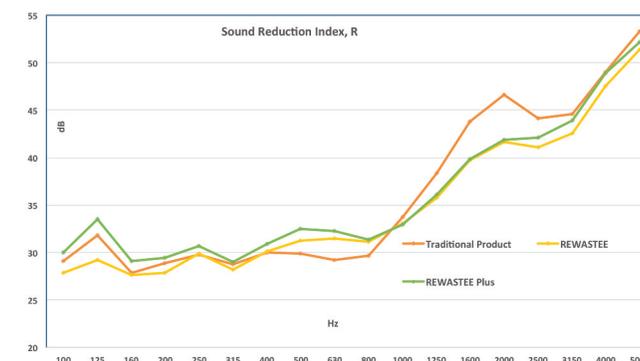
The membrane is placed directly on the roof corrugated steel sheet, in a plane form between thermal insulations. The membrane can be fixed to the metal, or else held in place by the fixing of the insulation material on top.

## Performance

### Airborne Sound Insulation

(tested in accordance with UNE-EN ISO 10140-2:2011)

The acoustic performance of the REWASTE products was tested. A traditional high density polymer-based membrane was also tested in order to provide a performance comparison. The results provide independent confirmation of the excellent performance of the REWASTE materials. Additional tests (including a range of general material properties, thermal conductivity, etc.) have been completed previously. For further information please see our website.



Test Specimen Reference	Test Specimen Description (Insulation Membranes)
Traditional Product	High density polymer-based membrane, of 5mm thickness and mass per unit area 10 kg/m <sup>2</sup>
REWASTE	REWASTE Material of 5 mm thickness and mass per unit area 9.3 kg/m <sup>2</sup>
REWASTE Plus	REWASTE Plus Material of 5 mm thickness and mass per unit area 9.5 kg/m <sup>2</sup>

Test specimens composed of:

- gypsum plasterboard of 12.5mm + intermediate insulation membrane + gypsum plasterboard of 12.5mm.
- The materials are screwed.
- Test specimen dimensions: 1200mm x 1480mm