GLASSPLUS Project

Porcelain stoneware tiles, made of a mixture rich in recycled material obtained from the disposal of CRTs and old TVs

waste management | Waste sorting | recovery of waste

PROJECT DESCRIPTION

The Glass Plus project had the aim of creating new possibilities to recycle old cathode ray tube televisions, creating gres tiles containing in the ceramic blend significant quantities of materials deriving form the cathod tubes; the project objective was to create materials of high aesthetic and technical quality, compliant with the LEED (Leadership in Energy and Environmental Design) environmental standards, the main worldwide rating system for sustainable buildings.

OBJECTIVES

A further objective was that of saving natural resources and energy, as well as restoring to new life a precious post-consumer civil waste.

The whole process, from the glass of the CRT TV to the tile, has been redefined. The innovative ceramic products realized with a substrate with high content of recycled material have been regularly marketed on a large scale.

The GLASS PLUS project logically also focused on the processes and technologies for the best disassembly and recycling of old televisions, with the aim of obtaining the best quality glass from this process, and in the best conditions for its use in the ceramic production.

In conclusion, the GLASS PLUS project has made it possible to create ceramic tiles in gres porcelain, with high technical and aesthetic qualities, in compliance with the strictest European and international product standards, despite the presence of high quantities of recycled glass inside.

PROJECT PHASES

The Glass Plus project had two specific and distinct macro-phases:

1. Collection of televisions, disassembly of the same, and separation of the cathode ray tube from the rest of the televisions' components. This macro-phase was developed with the project partners Relight (MI) and Vallone (VT).
2. Grinding of the glass, mixing of the glass into the ceramic blend and realization of the ceramic tiles. This macro-phase was developed with the project partners Meta (MO) and Refin (RE).

More specifically, the different phases of the Glass Plus project were:

- collection of old cathode ray tube televisions from the ecological islands by the project partners Relight (MI) and Vallone (VT);
- separation of the cathode glass tube from other parts in plastic, metal or other materials, performed at the plants of Relight in Rho (MI) and Vallone in Montalto di Castro (VT), than collection, recovery and treatment of the WEEE (waste from electrical and electronic equipment);
- grinding of the glass to optimal size and the needed granulometry for the ceramic industry;
- transport by road of the glass from Relight (MI) and Vallone (VT) to Meta (MO), a company specialized in the preparation of ceramic blends.
- realization at the Meta (MO) plant of the ceramic blend containing virgin raw materials such as clays and sands, and about 20% of glass deriving from the disposal of cathode tubes, envisaging:
    - mixing and wet grinding in continuous mills of the mix of virgin raw materials and recycled CRT glass
    - realization of the ceramic blend, called "atomized", inside the atomization plant
- transfer, on road by mobile silos, of the atomized ceramic blend from Meta (MO) to Ceramiche Refin (RE)
- realization at the Refin (RE) plant of gres ceramic tiles, envisaging the phases of:
    - pressing of the ceramic blend with the latest generation hydraulic presses
    - drying of the tile and reduction of its moisture content
    - decoration with the most modern ceramic decoration technologies
    - firing in a roller furnace with a rapid cycle and reaching temperatures close to 1200 ° C
    - squaring to uniform the dimensions of the tiles with tolerances of a few tenths of mm.
    - final selection and packaging
- marketing of the ceramic materials through the existing sales channels.

PROJECT RESULTS

The GLASS PLUS project's objective was the industrial-scale implementation of **an innovative production process of ceramic tiles** for floors and walls, using the panels of the old CRT televisions with cathode ray tube.

The use of glass deriving from old CRT tubes has led to a reduction in the use of feldspar, one of the main components of the traditional ceramic blend. The use of this material usually requires import from outside Europe, with consequent environmental impact due to its transportation.

The **recycling of glass** has made it possible to save huge quantities of this material from disposal, creating new value also for the recycling industry. It was an example of how a product that has reached the end of its life cycle can be reused - despite objective difficulties in its treatment and enhancement -, finding new life in a completely different sector.

The reduction of the environmental impact was calculated in approximately 0,7 kg CO_2 for each square meter produced, thanks to overcoming the import of feldspar from non-European mines, and therefore reducing transportation both by ship and by road. The overall reduction in CO_2 emissions, due to non-importing feldspar, was around 33 tons of CO_2 at the end of the project.

At the end of the project, each square meter of ceramic tiles contained, in addition to the traditional ceramic raw materials, 5 kg of glass (about 20% of the total) deriving from the disposal of old TVs.

To understand the worthiness of the project, a 70 square meter apartment covered with ceramic tiles, containing glass from cathode ray tube for 20% of the blend, uses 30 medium-sized TVs, i.e. about 300 kg of recycled glass.

After the realization of the blend with 20% CRT glass, other ceramic blends were experimented, to meet the needs of a wider range of clients, represented by several Italian ceramic manufacturing companies.

To date, over 6.400 tons of glass deriving from cathode ray tubes have been recovered by Meta in its Fiorano Modenese plant, for the creation of atomized ceramic blend serving as substrate for the ceramic tiles production.

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Acronym
GLASSPLUS

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Beneficiary Coordinator
META Spa

Contacts
Davide CARRA

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567.597,50

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Beneficiary headquarters

Via Sacco e Vanzetti, 48
41042 Fiorano MO
Italy

Region
Emilia-Romagna