



Collecting and recycling flat glass

Cor Wittekoek* highlights how the collection and subsequent recycling of flat glass contributes towards a circular economy.

Recycling is not a choice, but a necessity. After all, the depletion of the earth's raw materials has been a growing problem for many years. Our supplies of oil, gas, minerals and metals are being depleted so fast that it is uncertain how much more we can extract from the earth. Recycling is part of the solution to this issue.

Sheet glass is an umbrella term for the types of glass used in residential and utility buildings.

It is used in items such as windows and doors. But actually sheet glass has endless applications.

The range of properties that glass can be given during the manufacturing process makes it an extremely versatile material.

Glass can be used to improve both the interior and exterior appearance of buildings.

The construction sector generates thousands of tonnes of waste glass every year.

Sustainable demolition and renovation techniques mean more used sheet glass is now being separated at source for recycling.

Vlakglas Recycling Nederland, is committed to ensuring that the collection and recycling of waste sheet glass occurs consistently and systematically.

What is Vlakglas Recycling Nederland?

In 2000, Dutch sheet glass manufacturers launched an initiative to set up a voluntary recycling scheme to meet their responsibilities as producers of sheet glass. Vlakglas Recycling Nederland was founded in 2002.

The non-profit organisation coordinates all the activities associated with recycling and collecting waste glass in an efficient, environmentally friendly manner and at the lowest possible cost. The government has demonstrated its commitment to this process by legislating for the sheet glass recycling levy for double-glazing.

Vlakglas Recycling Nederland is financed by means of a recycling fee. This amounts to €0.30 for every m² of insulated glass that is produced in or imported into the Netherlands. The Ministry has declared that the agreement on the recycling fee is legally binding. This decision was published in the Staatscourant of 28 June 2016.

Vlakglas Recycling Nederland is responsible for collecting the recycling fee. The recycling fee is collected on a quarterly basis. Figures can be submitted using a secure website. After payment for the relevant year has been received,

each participant receives a certificate of participation.

Cradle-to-cradle

The idea behind the separate collection and recycling of sheet glass is the 'cradle-to-cradle' philosophy: the principle that after use, materials should be fully recyclable for use in other products. Recycling glass is one case where the cradle-to-cradle principle can be implemented with relative ease. There are three reasons for this: glass is completely reusable, recycling glass does not result in any loss of quality, and there is little waste. This creates a loop or cycle known as 'waste equals food'. But for this cycle to work properly, there is a need to separate biological and technical 'nutrients' (such as glass, metals and plastics) properly. This is the logic behind a nationwide system of collecting and recycling glass waste.

What happened to the waste glass fragments in 2018?

- Sheet-glass industry - 7,30%
- Insulation products - 35,40%
- Packaging glass industry - 47,30%
- Others - 1,90%

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▲ The construction sector generates many thousands of tonnes of waste glass every year.

▲ Vlakglas Recycling Nederland collected 73,637 tonnes of waste sheet glass in 2018, saving the equivalent of 8,541,892 kilos of CO₂.

One of the aims of Vlakglas Recycling Nederland is to achieve 20% of collected waste sheet glass to be used in sheet glass production.

Advantages of recycling sheet glass

The system of collection is intended for all those who work with waste glass: painters, glaziers, demolition companies, contractors, glass suppliers, glass processors, glass manufacturers and so on. Because the organisation is nationwide, it brings together all parties to cooperate effectively: companies involved in supplying glass, the collection network and the recycling companies. This saves money.

Dumping sheet glass in landfill as 'normal' waste actually costs the 'dumper' money. Plus, reusing waste glass reduces the amount of waste that has to be processed by landfill sites. In addition, recycling glass reduces the burden on our environment by reducing the need for 'fresh' raw materials to produce new glass.

The system of collection

Waste glass can be collected in various ways:

- Ad hoc (projects): Vlakglas Recycling Nederland can provide temporary containers for renovation or demolition projects. A small contribution towards the cost of these containers is required for this.
- Storage and transfer stations: A company can deposit waste sheet glass at one of Vlakglas Recycling Nederland's affiliated storage and transfer stations. A processing fee is charged.
- Collection points: Small amounts of sheet glass can be deposited free of charge at Vlakglas Recycling Nederland's collection points. These collection points can be found at selected glass resellers and

producers, but also at a number of major waste recycling centres.

- Container rental: Companies can also hire a container for their own use on site.
- Waste parks: Containers can be rented by waste parks so that small amounts of sheet glass waste can be deposited by consumers.

Clearly, it is important that the waste glass is clean when it is delivered to the collection points. Contaminated sheet glass is not recyclable and has to be disposed of as standard waste.

The glass cycle

After collection, the waste sheet glass is transported by boat or truck to specialist recycling plants. As there are no recycling facilities in The Netherlands, the cullet is shipped to recycle companies in Belgium and Germany. There, the dirt is removed from the glass and it is processed into cullet, which is made up of small pieces of cleaned recycled glass. This cullet can then be re-used in the glass industry.

All kinds of sheet glass are collected, including wire glass, laminated glass, coloured glass and double-glazing. The recycling company processes all these types of glass into a final product that is made of 100% pure glass. The incoming waste sheet glass is stripped of any foil, iron or other contaminants. Then it is crushed to pieces of the right size. The pieces are then mixed to the specifications of the purchaser and delivered to glass industry as a high-quality, consistent, homogenous and reliable product. Finally, the glass cullet is delivered to customers who reuse it.

Highest rate of reuse...

The flat glass waste that is collected is for 90% post-consumer and almost always polluted with other (attached) material.

This means that this cullet cannot be used for the production of new flatglass, but only for packaging glass and isolation products.

Vlak's aim is to reach a higher rate of recycling of cullet in the flatglass industry. It started a project with AGC Belgium and Maltha. For this project it received Life+ funding from the European Commission. This project aims to develop and validate an innovative method for recycling and up-cycling glass and other waste materials in the production of flat glass. This aim will be achieved through an innovative grinding technology that allows the content of recycled materials of the final flat glass to be raised to 25%, and the use of up to 55% of glass cullet. <https://www.agc-flattoflat.eu/>

Recycling in figures

- If sheet glass is not collected separately, but disposed of as regular construction and demolition waste, this means a CO₂ burden of 620 kilos.
- If 10% cullet is added to the mix of raw materials for glass production, 5% less CO₂ is emitted.
- If 10% cullet is added to the mix of raw materials for glass production, 2.5% less energy is used.
- One kilo of cullet can replace about 1.2 kilos of 'fresh' raw materials in glass production.
- Recycling 20 cm² of glass saves energy equivalent to lighting a 60-watt light bulb for four hours.
- In 2018, Vlakglas Recycling Nederland collected 73,637 tonnes of waste sheet glass. This saves the equivalent of 8,541,892 kilos of CO₂. ■

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