

## Recyclability evaluation of a combined fridge-freezer

Summary

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## Background and objectives

The company Vaillant would like to classify the results of a recyclability assessment for its Green iQ appliances in comparison to other typical appliances that are used every day in order to make this information easier to understand. Internet research carried out by Vaillant into companies that manufacture white goods did not yield any useful results with respect to possible comparative values for large domestic appliances. Vaillant therefore commissioned the Öko-Institut to evaluate the recyclability of such appliances.

Specifically, a combined fridge-freezer and a flat-screen television were examined. The following description refers to the combined fridge-freezer. A similar description is available for the flat-screen television.

## Recyclability assessment

When evaluating the recyclability of the combined fridge-freezer, the method used was the same as for the recyclability assessment of the ecoTEC exclusive Green iQ wall-hung boiler. The recyclability assessment assumes the following losses along the recycling chain:

**Table 1: Assumptions for estimating loss**

	Metals	Plastics	Large electronic components	Small electronic components	Magnets
Sorting loss	1–3%	5–15%	0%	100%	0% <sup>1</sup>
Losses during final treatment	0%	0%/100% <sup>2</sup>	84–69% <sup>3</sup>	---	30%

## Conclusion

The following conclusions can be drawn based on the analyses carried out:

- Given the assumptions made concerning actual waste-management conditions in Germany, **the recycling rate for the combined fridge-freezer examined is estimated to be around 75%.**
- The resulting cross-comparison shows that **the recyclability of a combined fridge-freezer (75%) is a little lower than that of a wall-hung boiler (about 82% for the ecoTEC exclusive Green iQ).**

<sup>1</sup> Sorted completely into the steel fraction. Although sorting into the steel fraction leads to a complete loss in the subsequent final treatment for any rare earths contained, such a method of sorting should be considered effective material recycling.

<sup>2</sup> Small plastic parts and fragments, elastomers and any plastics that are foamed, filled, painted and coated are subjected to thermal waste treatment, as are black plastics (except ABS and PS). Here, the recycling rate is 0% with a loss of 100%.

<sup>3</sup> Recycling information from Hagelüken and Buchert shows that recycling rates of 16% to 31% are achieved with respect to the total mass of input. Hagelüken, C.; Buchert, M.: The mine above ground – opportunities & challenges to recover scarce and valuable metals from EOL electronic devices. Presentation at the IERC, Salzburg, 17.01.2008.

- The assessment for both appliances was carried out using a uniform method, which means that the results can be compared at least in purely numerical terms due to the same methodological approach.<sup>4</sup>

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4 In principle, however, it must be remembered that very different product groups are being compared here. Combined fridge-freezers and wall-hung boilers are designed to perform fundamentally different functions. Given very different functional properties, there are specific requirements in terms of construction and design when it comes to material selection. This also means that there are different possibilities for both appliances in terms of optimal recyclability. It should also be noted that the assessment draws on country-specific data (for Germany), especially as regards collection systems, and this information cannot be applied directly to other countries without closer consideration.