

MedClean Propre Limpio



No. 117 Technological & environmental improvement of products

Eco-design of the industrial dishwasher model FI-30

Company	FAGOR Industrial S. Coop, Oñate (Spain)
Industrial sector	Manufacture of other general-purpose machinery ISIC Rev 4 n° 2819 (<i>International Standard Industrial Classification of all Economic Activities</i>)
Environmental considerations	Increasing public awareness about environmental matters, particularly energy saving & efficiency and climate change, the need to remain competitive in a global market and the appearance of the ErP (Energy-related Products) Eco-Design Directive 2009/125 EC (former EuP - Energy-using Products Directive (2005/32/EC), led the company FAGOR Industrial S.Coop. to become involved in this eco-design project.
Company background	FAGOR Industrial decided to take part through this case study in an eco-design pilot project addressed to the electrical and electronic sector, which was supported by Ihobe. This project was carried out between February and July 2009 and it concluded with the publication of an Electrical and Electronic Eco-design Guide by Ihobe in April 2010. The product assessed and eco-designed was the industrial dishwasher model FI-30. The appliance's performance reaches 360 dishes an hour, with a tank capacity of 25 litres and a total weight of about 58.10 kg. Its consumption per dishwashing cycle is 2.7 litres of water and 0.2984 kWh of electricity (estimated 100,000 cycles during its useful life).
Summary of actions	<p>To identify the main environmental aspects of the product, an environmental assessment - streamlined LCA - was carried out considering the whole product lifecycle (manufacturing, distribution, use and end-of-life) using the software tool EuPmanager[®], nowadays updated to a free cost version named EuPeco-profiler[®] under the LiMaS project (www.limas-eup.eu). This software tool uses the MEEuP methodology developed by VHK for the European Commission for assessing Energy-using Products.</p> <p>The graph below shows the environmental profile of the complete life cycle of this industrial dishwasher assuming a product lifetime of 100,000 cycles. As can be observed, 15% of its overall environmental impact corresponds to the manufacturing stage, 2% to distribution, 79% to actual use and 3% to the end-of-life stage. A more detailed analysis reveals the most significant aspects and thus the priority processes and materials for improvement efforts.</p>
	<p>Original industrial dishwasher FI-30</p>

Summary of actions (cont.)

After identifying the most significant aspects of the product and considering the main company's motivations, potential eco-design strategies were identified and evaluated for the improvement of the product. Not all the strategies initially drawn up were implemented in the final improved design, as some proved unviable due to technical and/or economical reasons.

The eco-design measures finally applied are summarised below:

Lower energy consumption

Reduction of heat losses: Use of double wall in the dishwasher to reduce heat losses and noise to the exterior (1% reduction of total energy consumption).

Improvement of water pre-heating: Thermal exchange between wash and rinse water with partial purge of the washing water in the tank (15% reduction of energy consumption during washing cycles).

Replacement of thermal sensors: More accurate control by changing thermostatic sensors by more precise electronic models (10% reduction of total energy consumption).

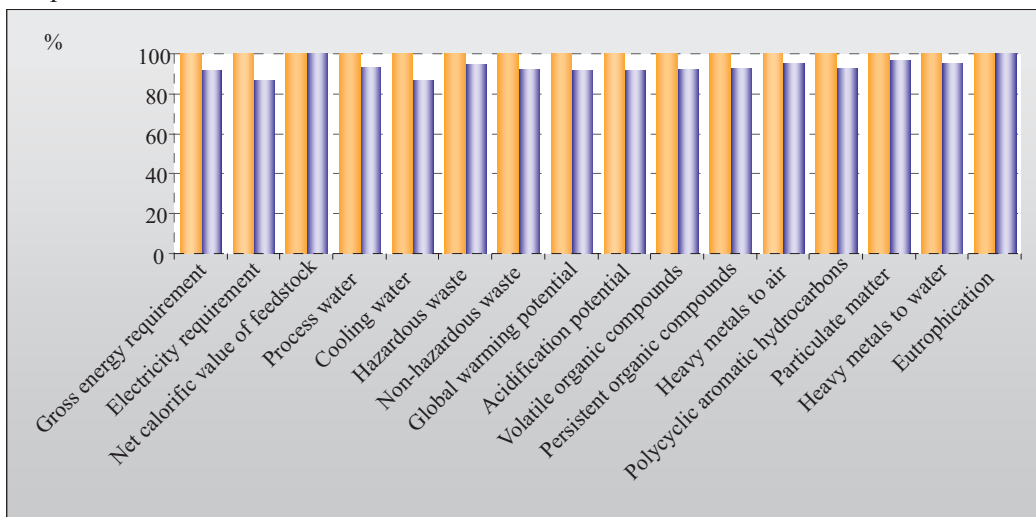
Lower water consumption

Reduction of tank capacity: Reduction of the tank size without affecting dishwashing performance (50% reduction of water consumption each time the tank is filled).

Redesign of sprinklers: New sprinklers design to improve their performance (i.e. lower water consumption).

Balances

The graph below shows the improvements in percentage terms achieved in each of the 16 environmental impact indicators considered, after the implementation of the eco-design measures described above. The average environmental improvement achieved in the redesigned model is 6.7%. A 13.2% reduction in energy consumption and a 6.2% reduction in water consumption during the useful lifetime were achieved. The new design implies total energy savings of 3,954 kWh (approx. 554 € during product lifetime) compared with the previous model.



Conclusions

The main benefits achieved in this eco-design project were the following:

Improvements in the product:

- 6.7% reduction in overall environmental impact
- 13.2% reduction in energy consumption during the useful lifetime
- 6.2% reduction in water consumption during the useful lifetime

Improvements in the company:

- Alignment with the future requirements of the ErP Directive (2009/125/EC)
- A greater capability for innovation through eco-design
- Market position improvement

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.



Regional Activity Centre
for Cleaner Production

Dr. Roux, 80
08017 Barcelona (Spain)
Tel. (+34) 93 553 87 90
Fax. (+34) 93 553 87 95
e-mail: cleanpro@cprac.org
<http://www.cprac.org>