

MedClean Propre Limpio Mediterranean


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Pollution prevention case studies

Ultrasonic welding system of plastic parts

Company	Peguform Ibérica, SL, Polinyà (Spain).
Industrial sector	Automotive. Manufacture of plastic parts for motor vehicles.
Environmental considerations	<p>Peguform Ibérica, SL manufactures plastic parts for the automobile industry such as, bumpers, shock absorbers, mudguards, door panels, trims, etc.</p> <p>The production process is based on the manufacture of the different plastic parts using injection machines and high temperature and pressure moulds. Subsequently, the paint, varnish and finish are applied.</p> <p>One of the manufactured pieces are the airbags. The passenger seat airbags must comply with the requirements of damage prevention to persons in case of use, which is achieved by using composite materials for the cover. These materials are obtained by joining a polypropylene part with an elastomer part (EPDM rubber).</p> <p>These two parts are joined together with a double injection machine that uses a one-shot system to join both parts through fusion heat. This technique causes many rejects due to lack of quality of the finished parts.</p>
Background	<p>The high costs that the company had to assume as a result of the large amount of waste generation and high consumption of raw materials and resources, led the company to implement an action plan in 2002 to minimise them.</p> <p>Actions focused on the following aims:</p> <ul style="list-style-type: none"> • Achieving a process that would allow the reduction of rejects from the manufacture of airbag covers. • Reducing the consumption of raw materials and resources by increasing process efficiency.
Summary of actions	<p>The project consisted of installing a system to join both parts using ultrasound or vibration welding. This technique allows welding the two parts using heat generated by the Joule effect.</p> <p>With this change in the way of joining the parts it has been possible to reduce the generation of non-conformities of parts that are joined and also of finished parts, thus minimising the generation of waste and reducing the raw materials and natural resources used.</p>

Photograph of the installation



Balances

	Old process	New process
Balance of materials		
Polypropylene consumption (t/y)	210	159.9
Elastomer consumption (EPDM rubber) (t/y)	22	Outsourcing manufacture
Injection rejects (t/y)	58	2.6
Economic balance		
Polypropylene cost (€/y)	273,000	207,900
Elastomer (EPDM) cost (€/y)	77,000	107,400*
Management cost of internal injection rejects (€/y)	1,000	48
Energy cost (€/y)	64,000	28,900
* Cost increase due to outsourcing manufacture		
Savings and expenses		
Savings in raw material consumption (€/y)		34,700
Savings in rejects management (€/y)		952
Energy savings (€/y)		35,100
Total savings (€/y)		70,752
Investment in installations (€)		51,700
Payback period (years)		0.73

Conclusions

The implementation of the project has led Peguform Ibérica, SL to minimise the amount of internal rejects from injected and welded parts, whether finished and painted or not, making it possible to reduce its internal rejects by 95.52% and its polypropylene consumption by 23.85%, while avoiding the processing of defective parts and the consumption of paint and resources such as energy and water, which lead to additional benefits aside from those shown on the balance and that are difficult to quantify.

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



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