

Think Solutions

ARCEL Resin Packaging Case Study: Environmental and Cost Benefits through Cube Optimization

Manufacturers of consumer electronics can expect exceptional environmental and cost benefits from using ARCEL resin for package cushioning. This case study demonstrates how ARCEL resin was able to help Hewlett-Packard realize the upside of downsizing.

The cube challenge

Hewlett-Packard, a global supplier of laser jet printers, was looking to further reduce the packaging size for one of their high-volume laser printers – without compromising product protection and while meeting their sustainability criteria and decreasing the overall cost of the packaging solution. Considering HP's strong commitment to improving the environmental performance of products throughout their life cycle, team members of the NOVA Chemicals Design Center began working on a packaging solution that would not only better protect the laser printer, but would also improve its environmental performance. As a part of their sustainability criteria, HP needed the Design Team to reduce the cube (overall packaging size) enough to allow for more boxes per pallet and per shipping container – ultimately limiting the environmental footprint of the packaging by using less material, which results in reduced freight energy consumption.

The difference with ARCEL resin

The NOVA Chemicals Design Team worked directly with HP to engineer a solution that met their criteria – protection, cost and sustainability. The new packaging solution was able to achieve the minimal cushion thickness while maintaining the expected damage protection – allowing for four additional units on every pallet shipped. The resilient properties of ARCEL resin provided a durable cushion capable of providing damage protection in an often “multiple-drop” global shipping environment.

This Case Study is one in a series demonstrating how ARCEL[®] advanced foam resin helps manufacturers achieve efficient, sustainable packaging.

ARCEL resin is a high-performance foam cushioning material that provides superb product protection and smaller cube sizes for domestic and international customers.



The existing HP high-volume laser printer was already packaged in an aggressive packaging design. The NOVA Chemicals Design Team was able to deliver even further cube reduction – resulting in an increased pallet unitization that allowed HP to minimize the environmental footprint of the package and lower the per-unit cost for the printers.

Package Design Comparison to achieve same level of protection

	EPS	ARCEL resin	Change from EPS to ARCEL resin
Cushion Weight per unit	370 g	275 g	26% lighter cushion
Outer Box Dimensions	600 x 500 x 367 mm	548 x 500 x 333 mm	17% smaller cube size
Units per 40-ft.-high cube truck or shipping container	504	588	17% more printers per load

Environmental Comparisons for same number of units shipped

Source of CO₂ Emissions	Emissions Change from EPS to ARCEL resin
Corrugated (based on box weight and includes 58% recycling rate)	8.7% less
Cushion (based on Frankin Associates LCI Results)	24.7% less
Ocean Freight (based on WRI Emissions Factor of 0.041843 lb CO ₂)	1.0% less
Land Freight	1.3% less
Total CO₂ Emissions	6.5% less

Total Cost Comparison for same number of units shipped

Cost Component	Cost Change from EPS to ARCEL resin
Corrugated	8.6% cost savings
Cushion	106% higher
Ocean Freight	14.3% cost savings
Land Freight	14.3% cost savings
Total Cost	4.7% cost savings

US Regional Office

NOVA Chemicals Inc.
400 Frankfort Road
Monaca, PA 15061 USA
Phone: 724.770.5555
Fax: 724.770.6767

Asian Operating Center

NOVA Chemicals (International) S.A.
Suite 1901, Chongqing Finance Center
No. 288 West Nanjing Rd, Shanghai, China
Phone: +86 21-3366 3418
Mobile: +86 13817951443

Singapore Sales Office

NOVA Chemicals (International) S.A.
The Executive Centre
Level 42, Six Battery Road
Singapore 049909
Phone: 65.6224.8807
Fax: 65.6224.1877

Pegasus Polymers NV

Exclusive distributor of ARCEL resin in Europe
Moerenstraat 85A
B-2370 Arendonk
BE0808842121, Belgium
Phone: +32-27-140100
Fax: +32-27-140150

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