

San Diego State University

Sustainable Packaging Redesign for Intravascular Cardiac Medical Devices

Project Overview

Challenge: Philips Image Guided Therapy Devices utilizes single-use plastic packaging for medical devices, presenting obstacles in aligning with modern sustainability goals.

Mission: Redesign of packaging to minimize single-use plastic and promote recycling of packaging in cardiac catheterization labs without compromising critical functionality and physician workflow. The redesign must be Ethylene Oxide (ETO) sterilizable and comply with ASTM D4169 (distribution testing) and ASTM D4332 (environmental conditioning) standards. Additionally, the new geometry must maintain consistent dimensions across various devices, accommodate an Instructions for Use (IFU) booklet, allow for product differentiation on the shelf, and meet all required labeling and regulatory standards.



BME

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Team Members





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Legacy vs. Solution

Tray		Undercut Geometry			Mass Comparison				
				000	Part	Old Mass		New Mass	
		FLUSH			Tray	34.7g		29.1g	
Pop-Out Retainers					Carton	99.0	99.0g 50.		
Legacy					IFU	144.0g		74g/86g	
					ii				
			Material Comparison						
Solution			Part Ol		d Material Ne		New	lew Material	
		3 CABLE	Tray		PETG	ETG		APET	
		SLIDE		on C	hipboard	Poster Board		er Board	
				27-401	b Offset Paper Thin B		ible Paper		
Carton									
cticker Sear			Der		Dimension Comparison				
Flap with Str		TOP TO	Part Old		UIMENSION	3 Min: 125 in ³			
			Carton 11 5		v 11 5 v 1i	$10 \times 10 \times 125$			
		PHILIPS		$\frac{11.3 \times 11.3}{11.1}$		$\frac{11}{5} = \frac{10 \times 10 \times 1.25}{10 \times 10 \times 1.25}$			
Legac				21.0 X	21.0 × 0.90		5.5 X 2	.4 X 0.300m	
to	-	- 0 +		350K BoM Comparison					
Solution			#	Part		Olo	d BoN	l New BoM	
			1	IFU		\$	0.80	\$0.40	
			2	Tyvek Pou	yvek Pouch		0.57	\$0.54	
				Packaging	ackaging Tray		0.50	\$0.42	
				Dispense	vispenser, Packaging		0.40	\$0.40	
IFU Opaque w/ Gloss Cover		FSC Certified	5 Chipboard		\$	0.40	\$0.38		
PHILIPS		and the second	6	Retainer, Packaging		\$	0.30	-	
Contraction of the second seco		Condension Caller Conner	7	-lushing Retainer		\$	0.25	-	
			8	Unilabel Background		\$ b	0.09	\$0.09	
	gacy	PHILIPS	9	Luer		\$	0.11	\$0.11	
		OmniWire Pressure guide wire	10	Blank Label, Device ID		ID \$	0.07	\$0.07	
		Modele: s9185/891851	11 Eto Steril		e Dot	\$	0.02	\$0.02	
Solutio		instruction for use	12	.2 Open this End Label		Ş	0.01	-	
Instructions for use						Ş	\$3.52 \$2.43		
			ח ח				\$1.03		
			ר	PROJECTED SAVINGS \$381,50				1,500	

CAD Assembly





Manufacturing

Tray Thermoforming nsert PET sheet in the airtight frame holder

> Precision cut the sheet to obtain the molded tray



Expose PET to heat 250-400°F 🚺 to soften sheet







Chipboard Die-Cutting

1. Use sheet metal mode in Solidworks to CAD the carton and flatten the model for a 2D template

2. Print out 1:1 template, transform to poster board; cut and fold into shape







Prototype / Testing





ASTM D4169 Shipping and Distribution Testing



Drop





Warehouse Stacking Loose Load Vibration Concentrated Impact Test and Setup

ASTM D4332 Environmental Conditioning









ASTM D4169 / ASTM D4332 Testing Results



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heat to achieve complex shape

3. Folded box with tearaway opening located at the top of the carton













