



Packaging Compliance

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Tyson Foods, Inc. Confidential

Agenda



-
- Introduction to Tyson Packaging Development
 - Packaging Compliance / EPR Landscape
 - EPR Mitigation Strategies
 - Long term Packaging Development Projects
 - Materials
 - Data Management

Packaging Development Organization



Three Disciplines

Packaging Development Engineers

Prepared

Fresh Meats

Poultry

Packaging Compliance / Sustainability

Industrial Design

Art Production / Asset Management

Own all Aspects of the PKG material spec

Material Spec

Overall Process Flow

Connecting the Dots

Regulatory

PMO

Art Production



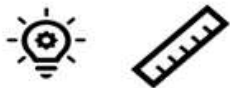
Packaging Development Organization



What We Aspire To

Deliver a best-in-class holistic packaging approach that connects structure and art and is grounded in creativity, accuracy, sustainability and speed. Through this approach, we will develop packaging technology with competitive advantages, create solutions that are good for the environment and our business, and enable experiences that delight our consumers.

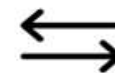
Strategy



INNOVATION / DESIGN



SUSTAINABILITY



PROCESS IMPROVEMENTS



PRODUCTIVITY: Continuously looking for efficiencies in all aspects of packaging

Enabling Software



Adobe Suite

- Illustrator
- Photoshop
- Lightroom
- Rush
- Modeler
- Substance
- Sampler

SolidWorks

- Structural CAD Design Software
- Visualizer

AutoCAD

Esko Suite

- Artios CAD (Structural Design Software)
- Cape (Palletization Software)
- Web Center (Digital Asset Management)
- Studio (3D Packaging Software)



Skill Sets



Hand Sketches

Prototyping

Photography

Graphic Design

Industrial Design

Packaging Design

Packaging Engineering

Industry Knowledge

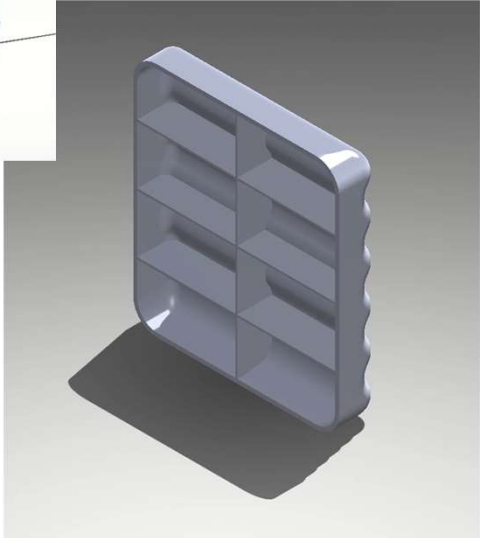
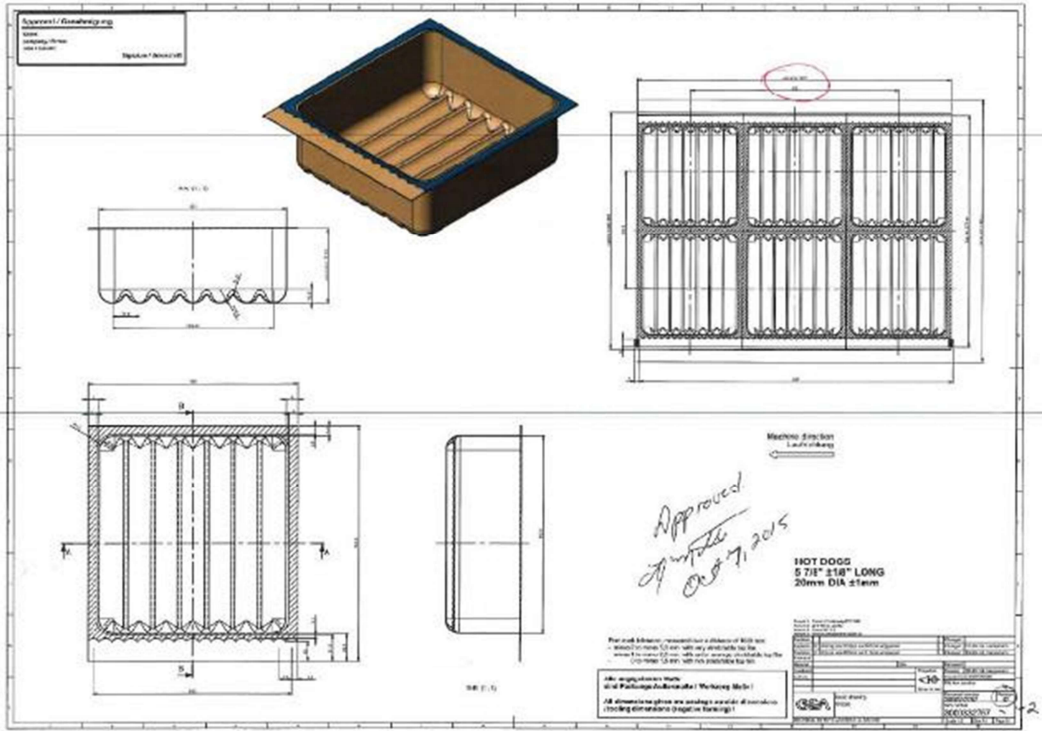
Tools and Capabilities

Industrial Design Tools and Capabilities

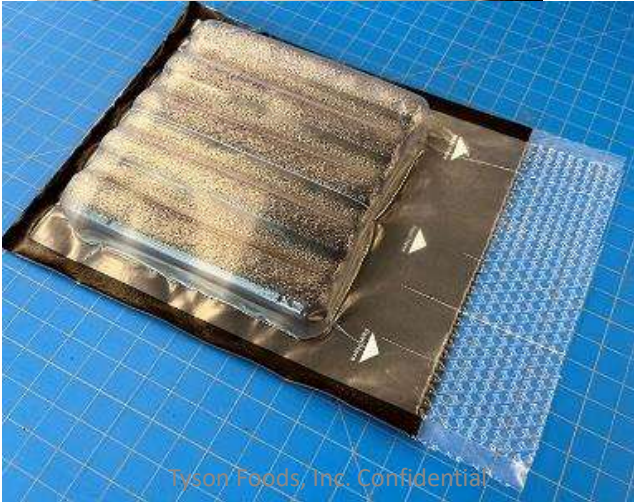
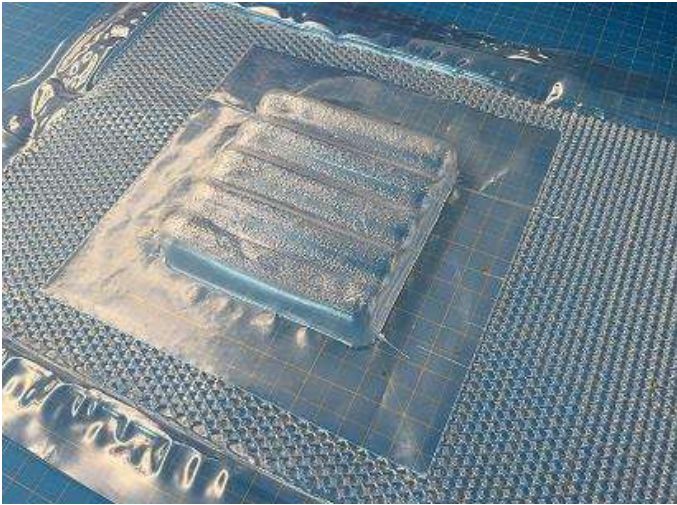
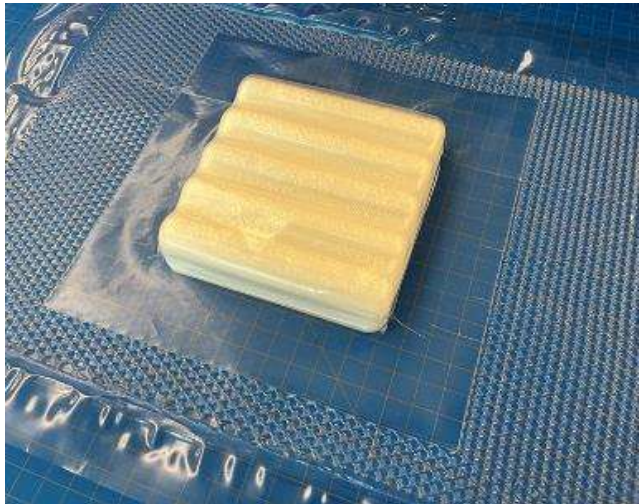
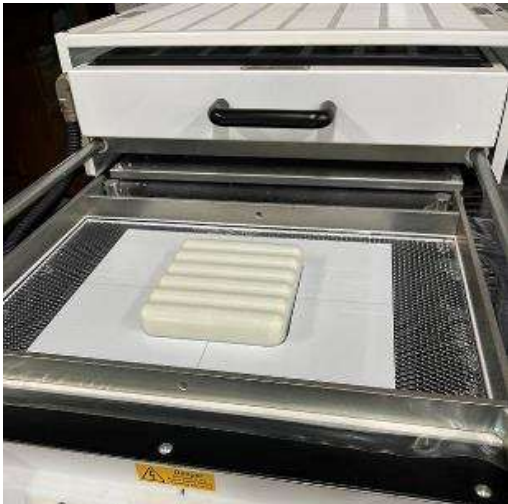


Formed Pocket Sausage Link Prototype

Tooling Insert



Formed Pocket Sausage Link Prototype



Formed Pocket Hillshire Sausage Prototype





Packaging Compliance

Extended Producer Responsibility

Extended Producer Responsibility (E.P.R.)



Definition

A policy requiring producers to manage the end-of-life of products, including disposal and recycling costs.



Goal

Shift responsibility for packaging waste from consumers and government to producers, incentivizing sustainable packaging design.



Applicability

Generally, applies to producers of single-use packaging products, with variations across states.



EPR - Broadly Speaking

- Fees are based on the volume and type of packaging produced and introduced into the market.
- Entities that introduce more material and less sustainable material are expected to pay higher fees.
- These fees in turn are allocated to fund collection, recycling, and final disposition activities.
- States will assign producer reduction targets.
- Data reporting, including reporting related to material type, material weight, how packaging was supplied to the market, and related information will be coordinated through a third-party contracted by the state that is called the PRO.

Key Components & Definitions



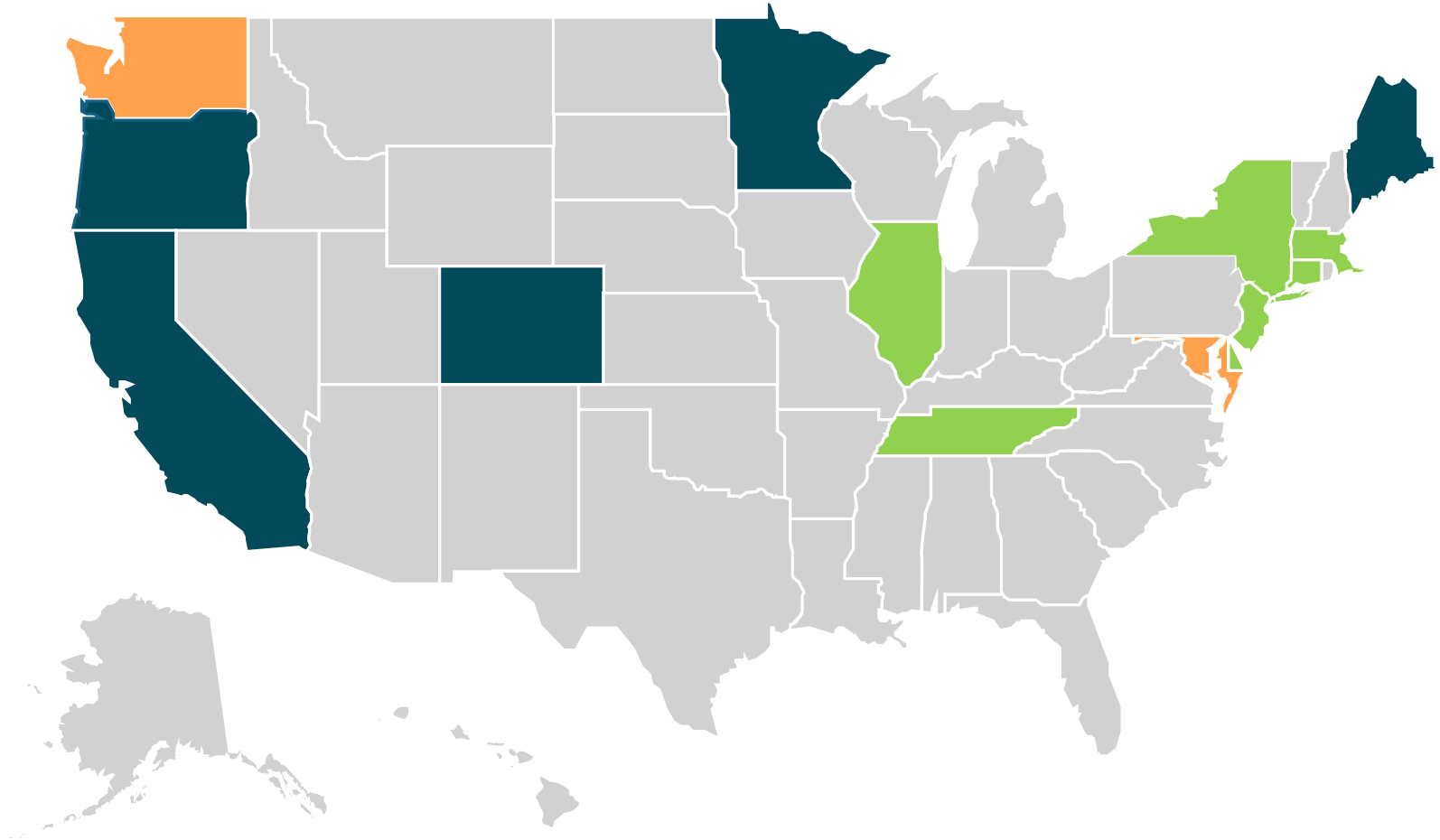
Covered Producers: Entities like manufacturers, brand owners, brand licensees, importers, distributors, and retailers.

Covered Products: Materials used to package, ship, serve, and display goods, such as packaging, single-use packaging, plastic packaging, food service ware, and glass containers.

Obligated Producers: Only one producer in a product's supply chain is responsible for reporting and fees under EPR laws.



EPR Landscape



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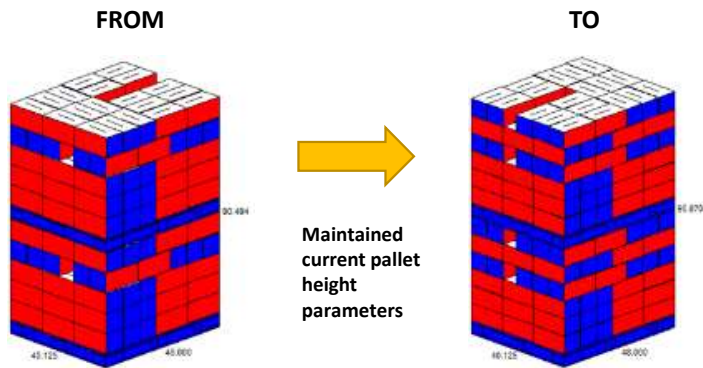
Mitigation Strategies

Increase Cube Utilization – JD Breakfast Bowl



Material Reductions

38 Case Increase per Pallet Load (DS)



Cases per Layer = 19
Layers per Pallet = 5
Cases per Pallet = 95
Double Stacked = Yes
Pallet Net Weight (DS) = **665 LB**

Cases per Layer = 19
Layers per Pallet = 6
Cases per Pallet = 114
Double Stacked = Yes
Pallet Net Wt. (DS) = **798 LB**

- 1,071,200 LB of Plastic
- 1,093,241 LB of Paperboard
- 989,626 LB of Corrugate
- 44,670 Less Pallet Loads
- 696 Less Truck Loads

Increase Cube Utilization



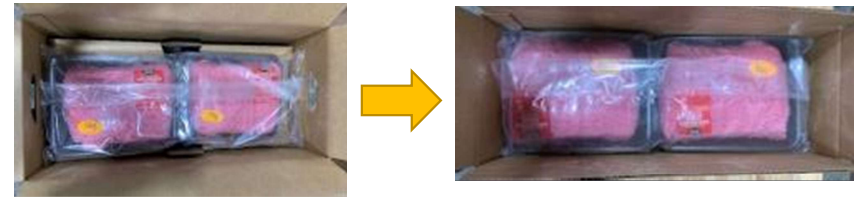
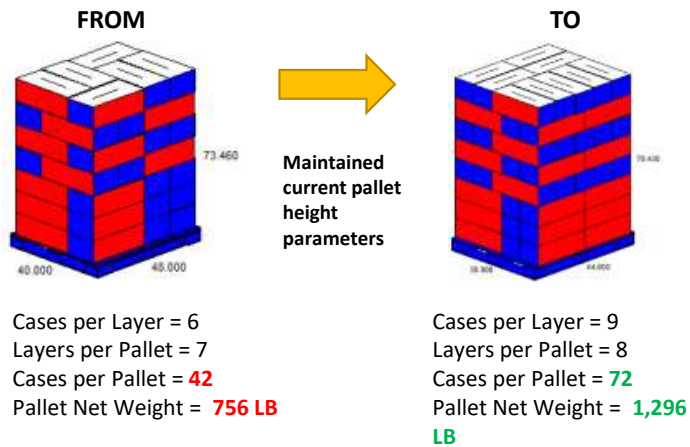
Material Reductions

- Better utilize the available cubic volume on a pallet
- Optimal case weight / count
- Maximize pallet weight
- Increase pallet stability

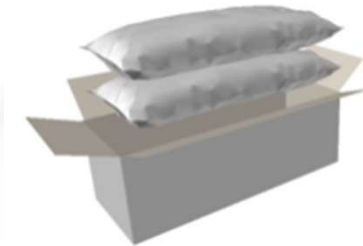
Customer Positioning

- Increase in pallet efficiency
- Less pallets to handle / store
- Increased pallet load stability
- Fewer trucks to transport product
- Investing in internal capability to deliver PKG / Process Improvements
- Customers are requiring sustainable PKG solutions and CO2 reductions

Pallet Pattern: **540 LB** Increase per Load









- 2 Trays per master bag (**No Change**)
- 2 Master bags per case (**No Change**)
- 4 Trays per case (**No Change**)



	OD L	OD W	OD H
Current	23.8125	11.6875	9.6875
New	22.3125	8.8125	9.125

Packaging Format Selection



Indicator	Tray Lid MAP (1 lb) BASELINE	case ready meat - EPS/PVC/masterbag	ground beef brick pack, 1 lb, by piece	<u>Any Barrier Film</u> ground beef retail flow wrap by piece (1 lb)	<u>Amcor's AmPrima</u> ground beef retail flow wrap by piece (1 lb)	<u>Amcor's AmPrima</u> ground beef retail flow wrap by piece (1 lb) <u>[if recycled]</u>
						
Non-renewable primary energy	0%	+33%	-55%	-51%	-63%	-86%
Carbon footprint, fossil	0%	+14%	-51%	-47%	-63%	-79%
Summer smog	0%	+16%	-29%	-23%	-45%	-66%
Water Consumption	0%	+7%	-64%	-53%	-63%	-81%
ReCiPe	0%	+22%	-53%	-50%	-64%	-85%

Alternate Tray Options For EPS Tray Replacement



Fossil Fuel Based Options



EPS Foam (Control):

- Packaging legislation banning or limiting the use of EPS Foam across the country continues to rise
- Key customers banning or limiting the use of EPS Foam
- Pressure from Influencers remains on the rise: Ellen MacArthur Foundation, U.S. Plastics Pact, Competitors, etc.



APET and other Rigid Plastics:

- 3x the weight of EPS Foam (except foamed PET)
- highest long term cost option because of the increase plastic use
- Worst option when considering EPR fee schemes in the future
- Designed for recyclability, but not proven due to food contamination
- Requires drastic process/handling changes at the plant level
- PCR content is an option



ePET (Expanded PET):

- 2x the weight of EPS Foam
- higher long term cost option because of the increase plastic use
- 'NOT' APR certified Recyclable
- Run-ability while better than APET is not at parity with Bio-Resin or RDPP
- PCR content is an option



RDPP (Reduced Density PP or ePP):

- **RECOMMENDATION**
- 'Drop-In' solution requiring no process/handling changes
- 1.7x the weight of EPS Foam
- APR Certified Recyclable
- Best option when considering EPR fee schemes in the future
- PCR content is an option

Non-Fossil Fuel Based Options



Pulp Fiber:

- 5x the weight of EPS Foam to achieve structural integrity
- Heaviest option – logistics and ergonomic penalties
- Control of tare wt. and moisture absorption is a long-term concern
- Inconsistent tare weights will lead to excessive product giveaway
- Achieving recyclable certifications has proved to be challenging due to the amount and types of coatings required
- Supplier tray capacity and size scalability are long term concerns



Pressed Paperboard:

- 1.6x the weight of EPS Foam
- Processor grade tray options are limited to only the smaller tray sizes (19, 2, 3, and 4)
- Structural integrity is marginal in processor grade
- Only viable in applications in which the tray can be filled completely
- Recyclable and PCR potential
- PET film laminated (minimal fossil fuel based)
- Only option to offer color / print capabilities (inside and out)



Bio-Resin (Compostable):

- **BEST ALTERNATIVE TRAY**
- Foam Cellulose Acetate
- 1.5x the weight of EPS Foam (lightest alternative to date)
- Best available sustainable tray alternative
- Only option that eliminates the use of fossil fuel-based resins
- Utilizes 40% PCR
- BPI certified compostable
- Imperceptible to EPS Foam at point of sale / consumer use
- 'Drop-In' solution requiring no process/handling changes
- **Cost is the largest concern on-going**

Tyson Packaging Compliance – Development Projects



EPS Alternate Tray Development

Recommendation = Reduced Density PP

PVC overwrap film replacement

Currently testing 2nd generation PE structure

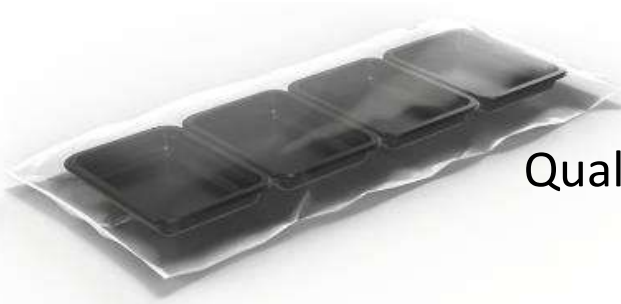
Recycle-ready master bags

(designed for H2R in-store Drop off)

Qualified 2 suppliers – Awaiting scale-up testing

Shrink Bags

PVdC barrier removal & Recycle Ready





Data management: How do we plan for future reporting requirements...

Packaging groups require a robust system to manage and report on packaging data, not just write static specifications. The information requirements today are highly nuanced and complex. New packaging legislation and regulations governing packaging chemistry, disposal considerations, labeling; along with increasingly specific customer requirements are highly dynamic, ever-changing, and complex.



Thank You!

Questions