FOLDING CARTON AS THE NEXT INDUSTRY DISRUPTOR

September 11, 2024

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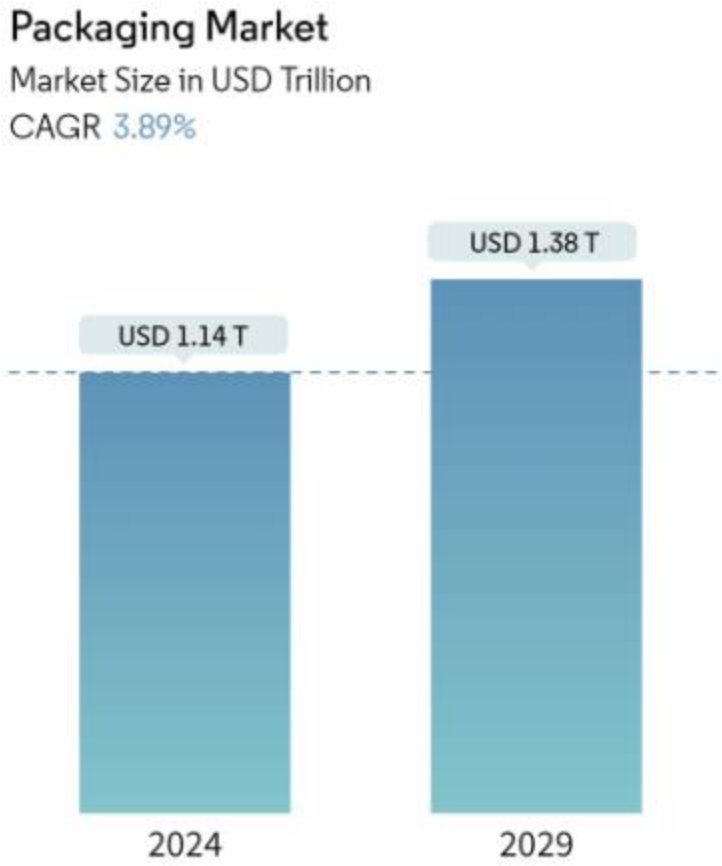
The Packaging Industry

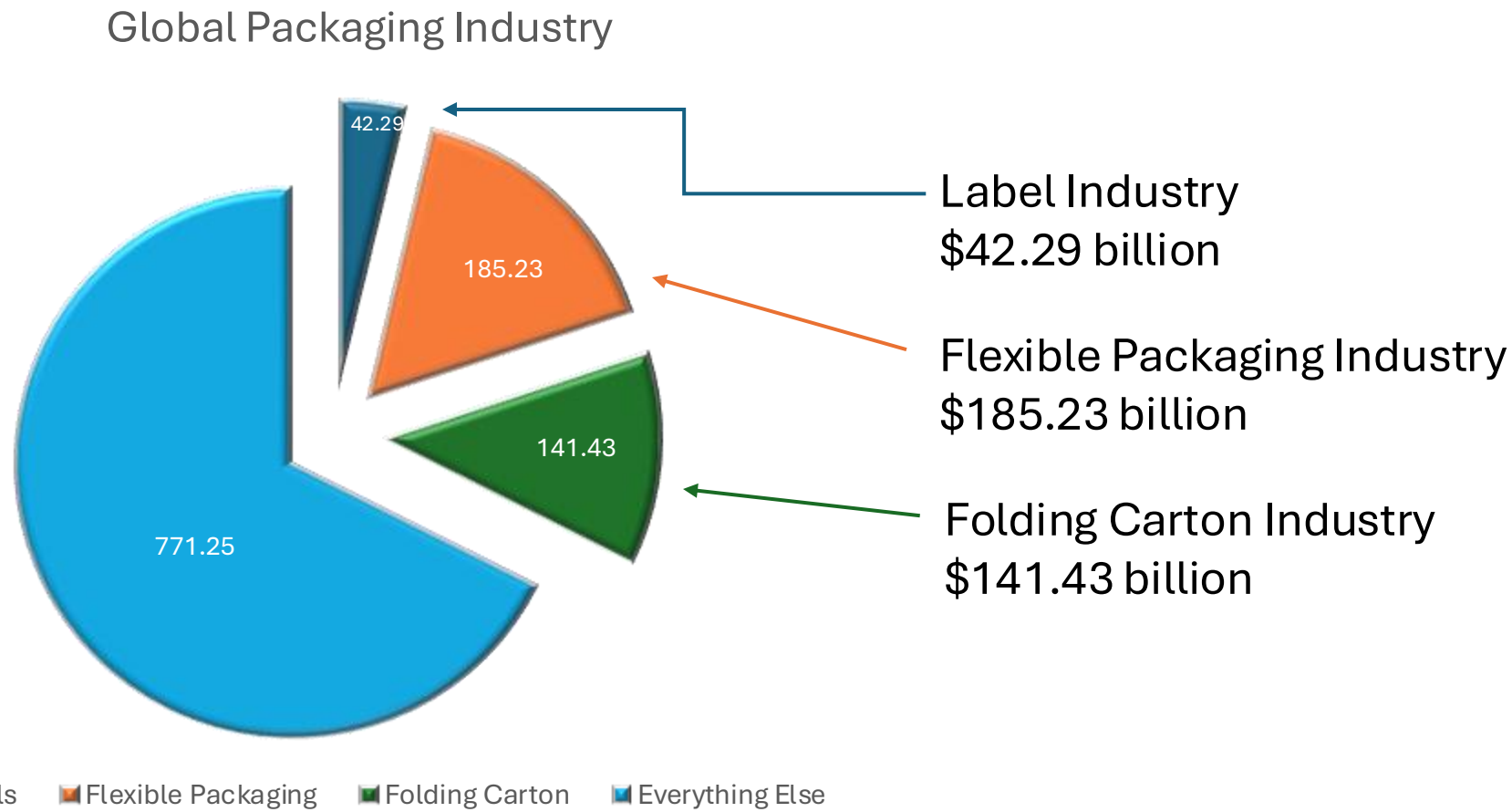


- 1.14 Trillion in 2024
  1.38 Trillion by 2029

- Data includes Plastic packaging, Paper & Paperboard, Metal Packaging, Glass Containers

Mordor Intelligence – Packaging Market Size (2024-2029)

Industry Comparisons



Label Industry
$42.29 billion

Flexible Packaging Industry
$185.23 billion

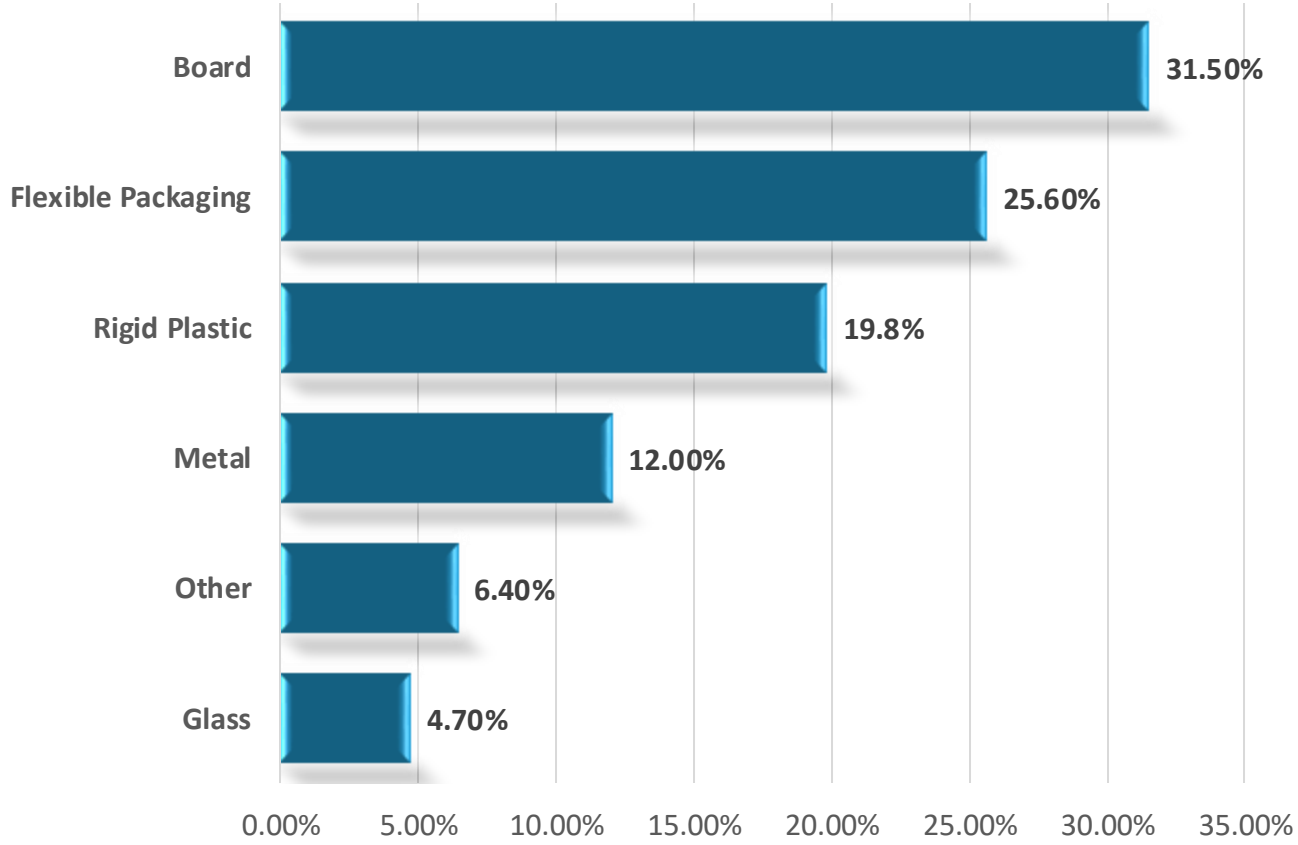
Folding Carton Industry
$141.43 billion

Folding Carton

...it's EVERYWHERE!

Largest Projected Industry Growth

- Flexible plastics and paperboard will be the fastest growing packaging materials.
- Global packaging sales value will increase at a compound annual growth rate (CAGR) of 3.9% to reach $1.42 trillion in 2028.



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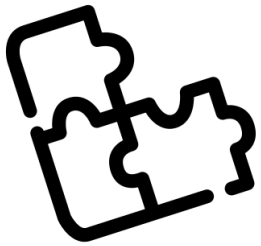
Smithers 2023 – The Future of Global Packaging to 2028

Industries Currently Using Folding Carton

Retail

Cosmetics

Pharmaceutical



Toys & Games

Home & Decor

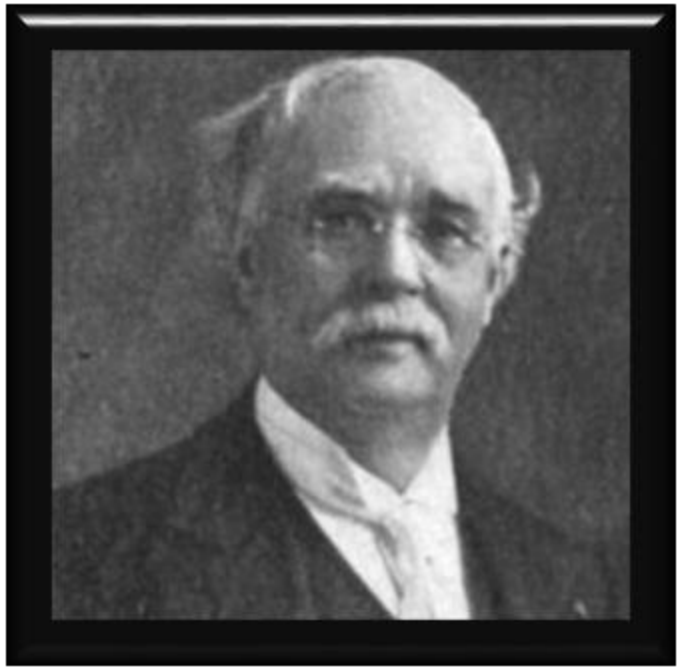
Foods

Beverages

Automotive

Types of Products in Folding Cartons

History of Folding Carton



Robert Gair
Inventor of Folding Carton
1879

Packages that build volume

Leading manufacturers everywhere realize the increased value of effective designs.

https://turnstiletours.com/boxed-in-brooklyn-robert-gair-and-the-packaging-revolution/

Factors Influencing Folding Carton Growth

- Easy to Transport
- Reduction in Plastic Use
- Cost Effective
- E-commerce




Very Demotional.com, Sam's Packaging, MilesWeb

Factors Influencing Folding Carton Growth

- **Advancements in Print Technology – Offset & Digital**
  - Fully Customizable
  - Products stand out more on a shelf and help support corporate branding strategies.
  - Customizable based on production and equipment filling requirements.

Factors Influencing Folding Carton Growth

Sustainability: Recyclability, & Biodegradable

1 Higher consumer awareness

- Technology & Social Media have spread the movement.
- Consumers are willing to substitute packaging that does not meet sustainability requirements.

2 Tougher regulatory pressure

- States & Local Restrictions: i.e. (banning straws and grocery bags)
- Legal obligations for emission reductions
- International obligations in Europe and beyond.

3 New business potential

- Availability/willingness of consumers to pay higher prices for sustainable packaging.
- Improving supply chain management (availability, quality, price, and sustainability of raw materials)

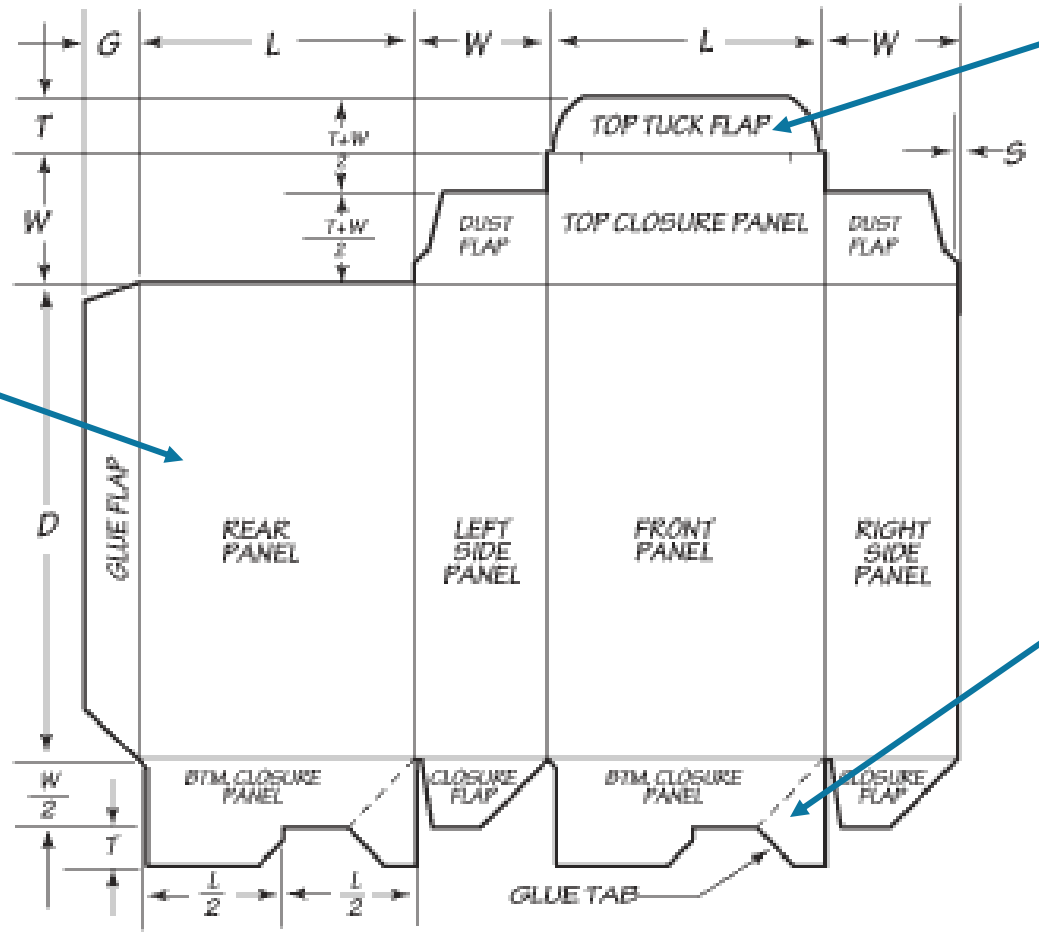
Factors Influencing Folding Carton Growth

- **Sustainability, Recyclability, & Biodegradable**
  - Paperboard/Fiber Based
  - Easy to Recycle
  - Sustainability Certifications

Folding Carton Terms

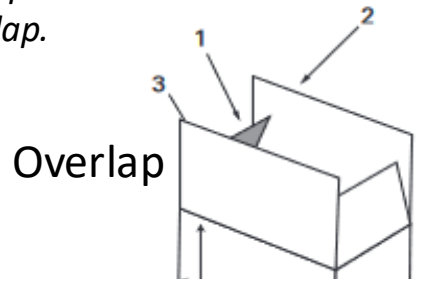
PANELS

Panels are the major component parts of a folding carton, which define the major outer or partition elements.



FLAPS

Flaps are secondary carton elements, hinge-connected along a free edge of a panel or another flap.



TABS

Tabs are tertiary carton elements, hinged to a portion of a free edge of a panel or flap, or struck from without the plane of a panel or flap.

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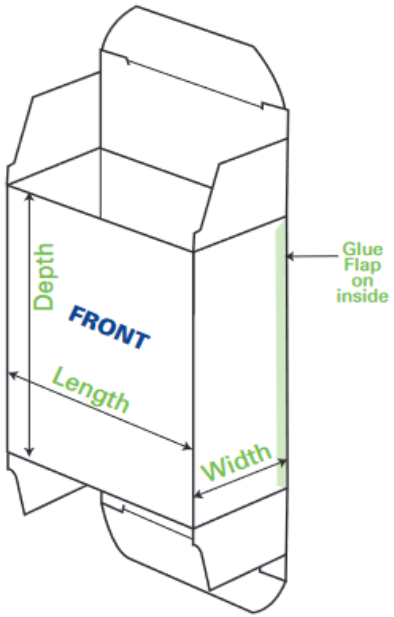
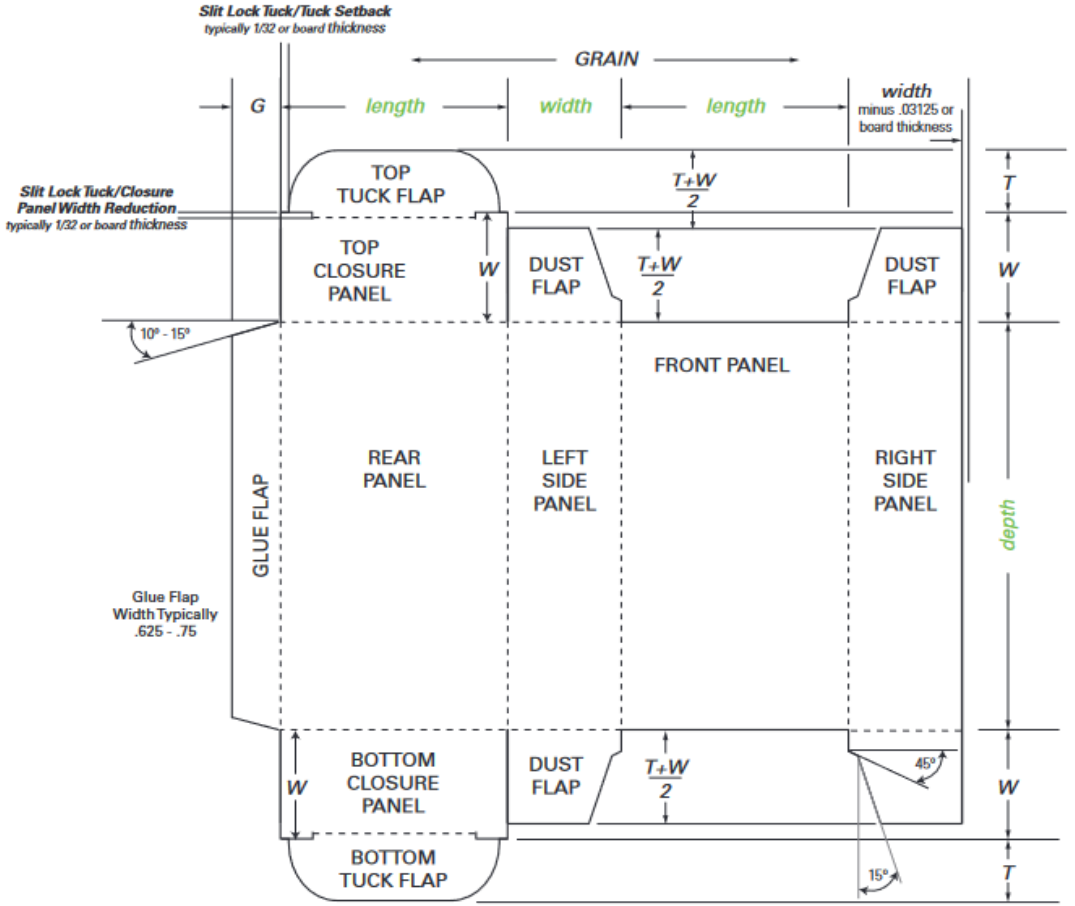
Standard Straight Tuck

This style features closure panels on both the top and bottom that swing from the rear to tuck in the front.





PROS

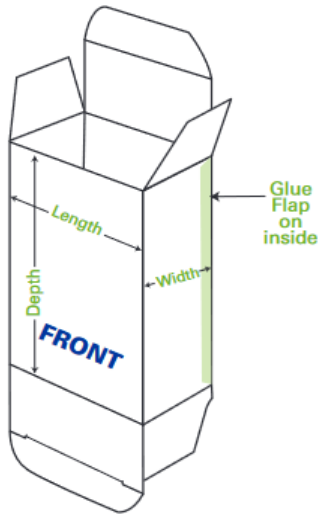
- Easy Assembly
- Works well for lighter weight products

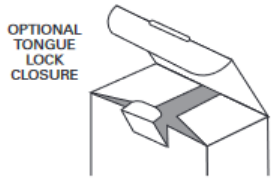
CONS

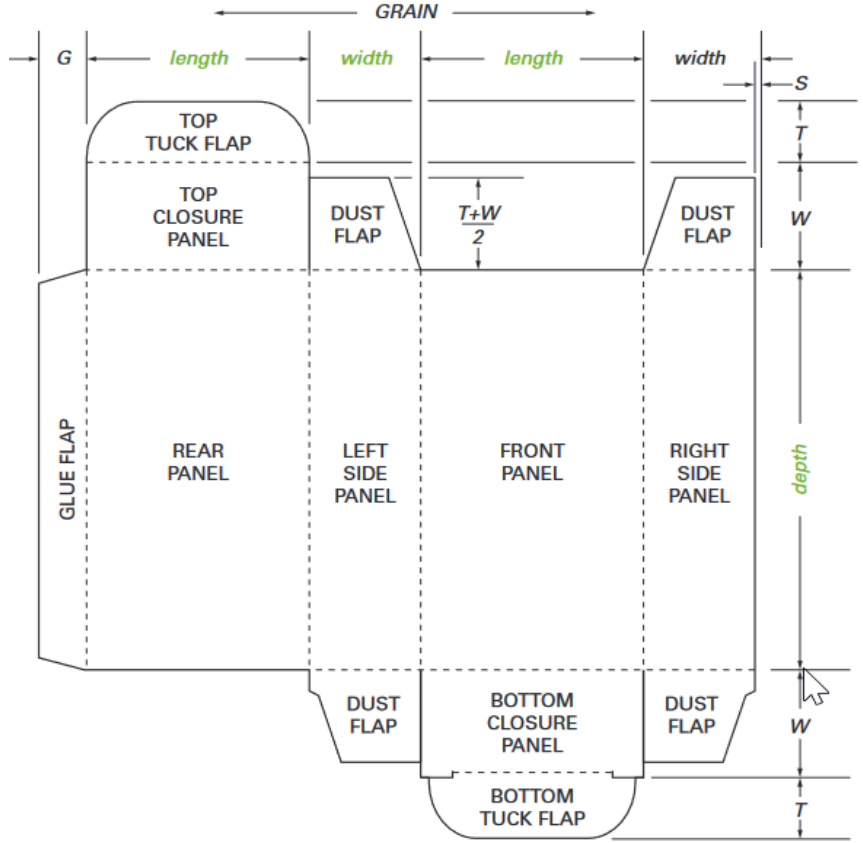
- More Expensive
- Not good for heavy products

Standard Reverse Tuck

An economical choice RTE nests better than STE (Straight Tuck End). Tucks may have either friction fit or slit locks for a more secure closure. Suited to either automatic or manual product loading and are easier to open and close.







PROS

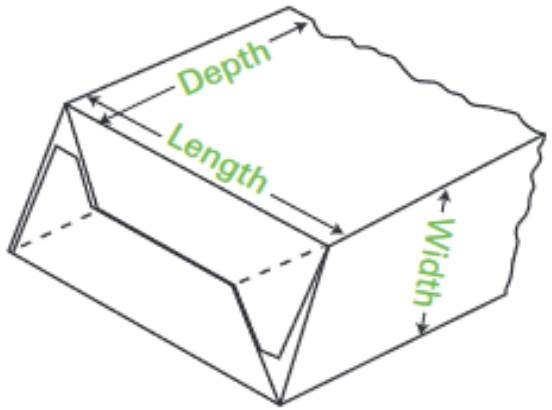
- Cost effective, fits more blanks on a sheet compared to Straight Tuck End, reducing waste and setup fees.
- Easy Assembly
- Works well for lighter weight products

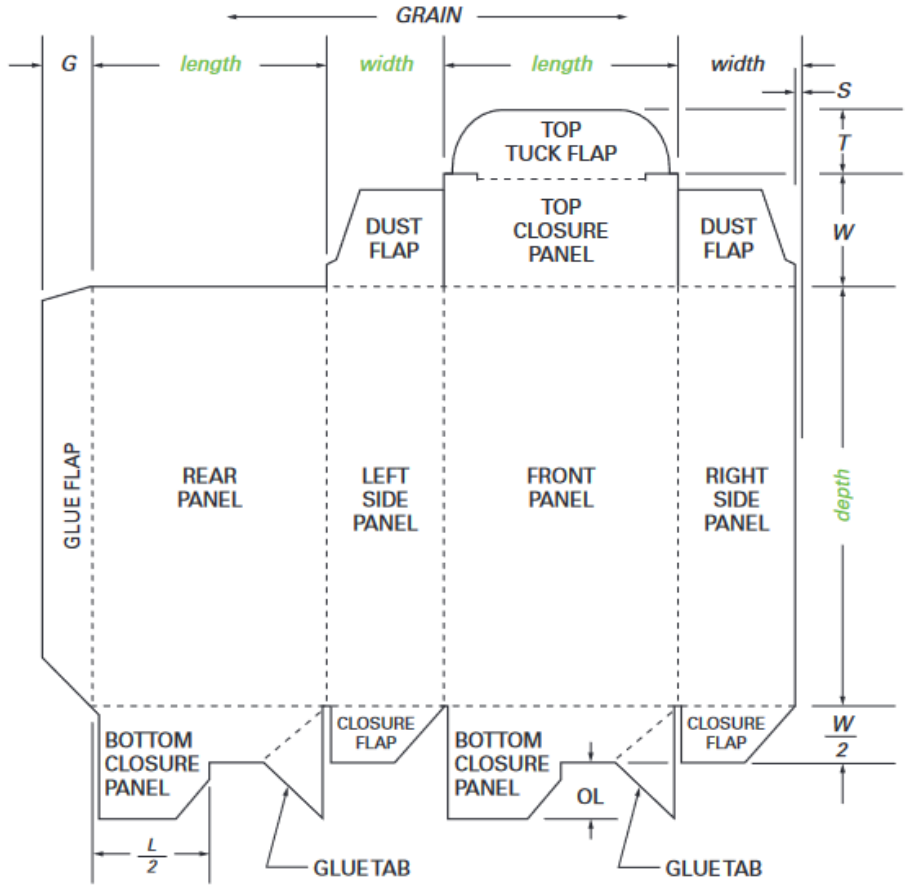
CONS

- Not good for heavy products

Tuck Top Auto bottom

This style is used to reduce assembly labor.





PROS

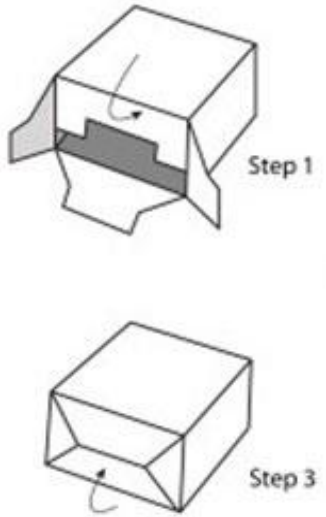
- Works very well for heavier products
- Ultra fast assembly
- Can be assembled on automated filling equipment
- Super speedy loading
- Compact storage (stores flat) for excess packaging inventory

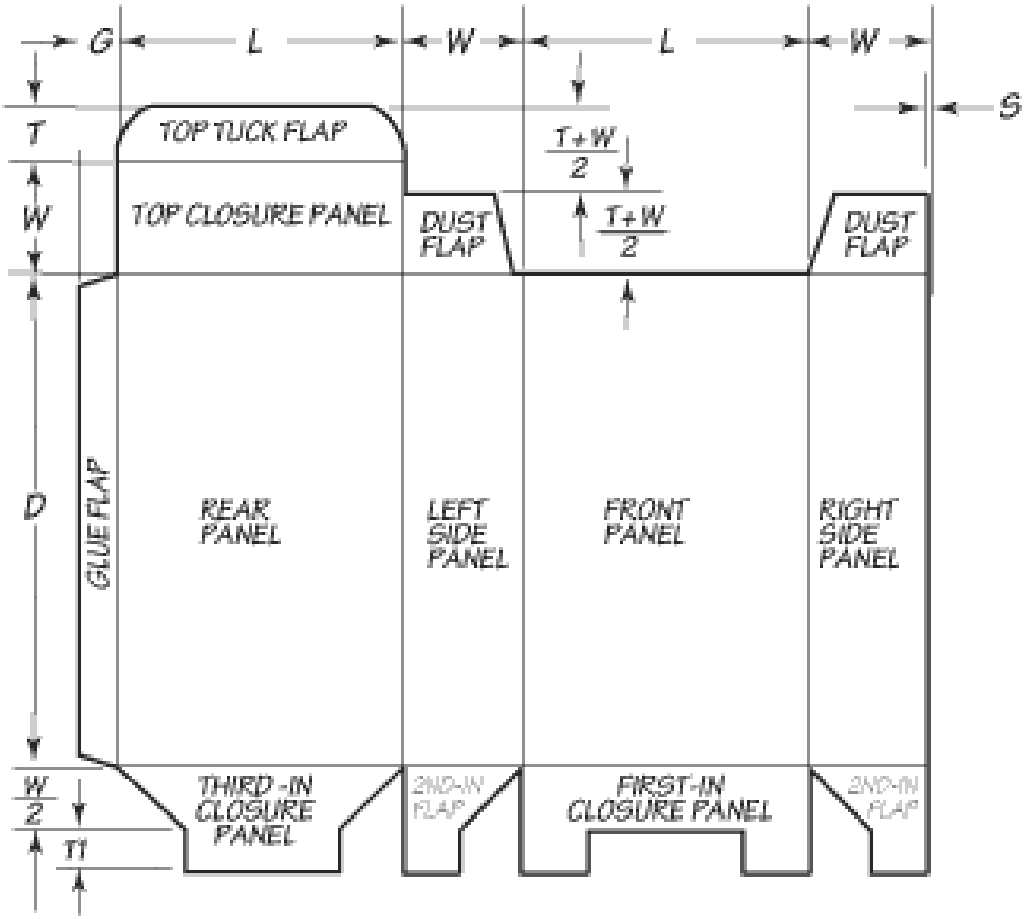
CONS

- More expensive because bottoms have the extra step of gluing

Tuck Top Snap Lock Bottom

This style box is widely used in retail for frozen prepared foods and is assembled and sealed manually.





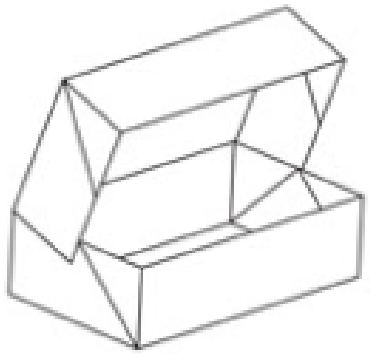
PROS

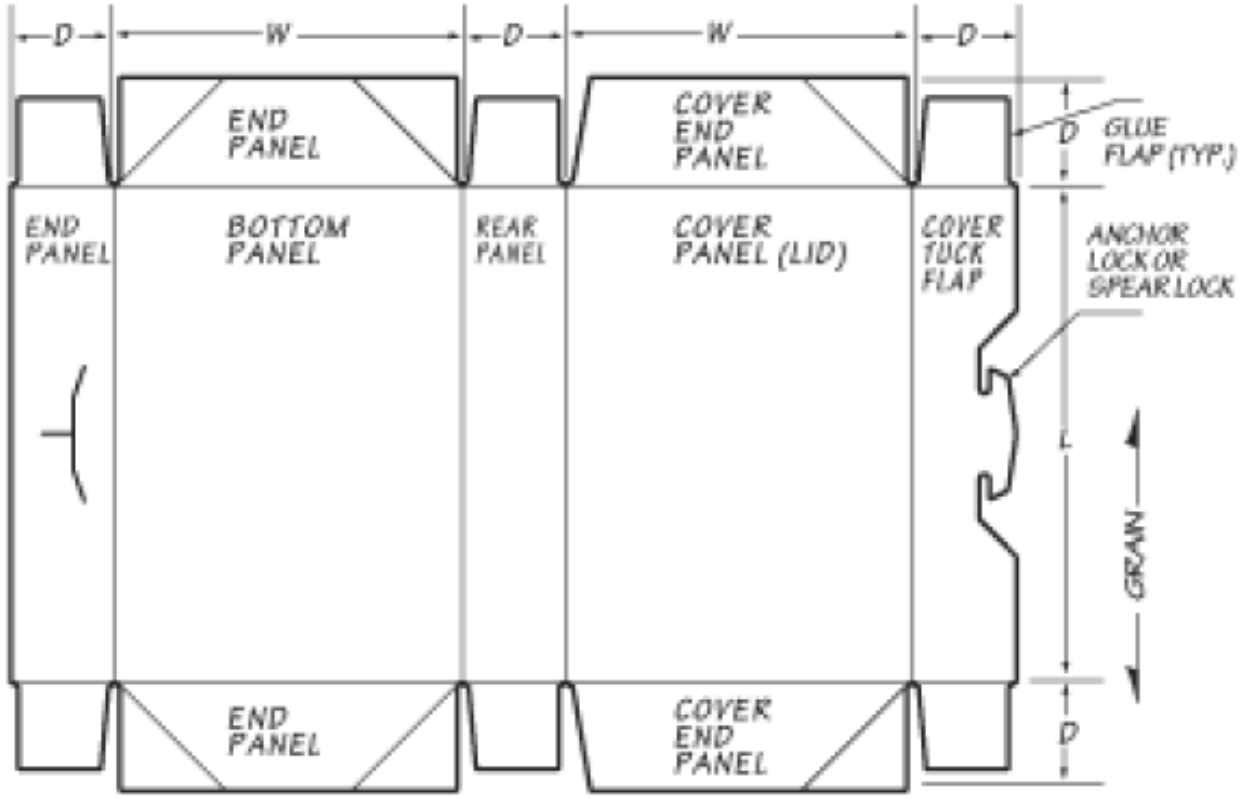
- Works very well for heavier products
- Cheaper than Auto bottom
- Ultra fast assembly
- Could be assembled on specialized equipment
- Super speedy loading
- Compact storage (stores flat)

CONS

- Takes longer to assemble than auto-bottom boxes

One-Piece Tuck-Top Box





Current Market Trends in Folding Carton

- **Anti-counterfeit & Smart Packaging**

  QR Codes, NFC tags, and RFID to improve customer experience and provide extended content information.

Current Market Trends in Folding Carton (cont.)

- **Biodegradable & Compostable Materials**

More sustainable materials being introduced including inks, bio-based materials, recycled content, and etc. Thus, replacing some products that were going in plastic packaging.

Current Market Trends in Folding Carton

Frugalpac Wine Bottles

Differentiation
360 Degree area to decorate
Less chance of breakage
Safe for many areas glass is not permitted

Cost Competitiveness
No shipping dividers needed
Smaller boxes for shipping
Lightweight allowing increased pallet space

Sustainability
5x lighter than glass
6x lower carbon footprint
77% less plastic
Separates to be properly recycled

Environmental Impact
16% Lower than recycled bottle
78% Lower than virgin material plastics
82% Lower than standard glass
76% Lower than lightweight glass

Carbon Footprint
30% Lower than recycled bottle
67% Lower than virgin material plastics
84% Lower than standard glass
76% Lower than lightweight glass

The 8 Not-So-Simple Steps to Produce Packaging

1. Product Development/ Marketing Campaign Origination
2. Packaging Concept & Design Intent
3. Development & Structural Engineering
4. Design Execution & Print File Creation
5. Supplier Selection, Ordering Strategy, Pricing & PO
6. Design Approvals & Tooling Creation
7. Production of Packaging
   - Print and/or Cold Foil
   - Spot and/or Flood Coating
   - Hot Foil, Emboss
   - Die Cut
   - Fold and Glue
8. Shipping & Receiving

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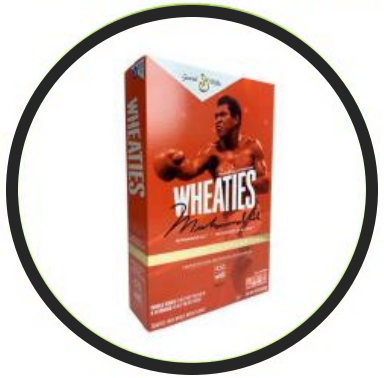
Embellishments & Finishes

Coatings

Extended Gamut

Foil Stamping / Embossing



Cold Foil

Specialty Substrates

Embossing/Debossing

Windowing

The Production Process

Design & Pre-Press

- **Structural & graphic design**: Engineering and visualization of a carton using CAD software to ensure the desired function, look and "manufacturability"
- **Dielines & proofing**: 2D blueprints and digital proofs of finished artwork which the customer "signs-off" on
- **Pre-press**: Preparing for printing via file conversion (computer to plate) and stripping (separating artwork from die-line)

Sheeting & Printing

- **Sheeting**: Paperboard rolls are cut into sheets to be fed into the press
- **Printing:** Offset lithography for medium- or large-volume orders, and digital printing for shorter-runs (including prototypes).

Decorative Effects

- **Hot & cold foil stamping:** Application of ultra-thin foils or holograms to a surface to create a "metallic flash". Stampers can be offline, standalone machines, or inline with a printing press
- **Embossing / debossing:** Raising / lowering a design element on a substrate to create depth and texture. Added on separate emboss / deboss machine with a custom die

Die-Cutting

- **Die-cutting & creasing**: Cuts layout out of a sheet. Also able to make scores, holes, partial cuts and perforations to create the creases to allow for easy folding. Usually done offline with a separate machine

Folding & Gluing

- **Folding & gluing:** Flat die-cut pieces are fed through folder-gluer when specially position guides, rotary hooks and other devices fold panels while adhesive systems apply glue
- **Windowing**: Rigid (APET) and flexible (polyester) windows to create visible link between packaging and product. May be integrated with folders / gluers or performed on a separate window-patching machine

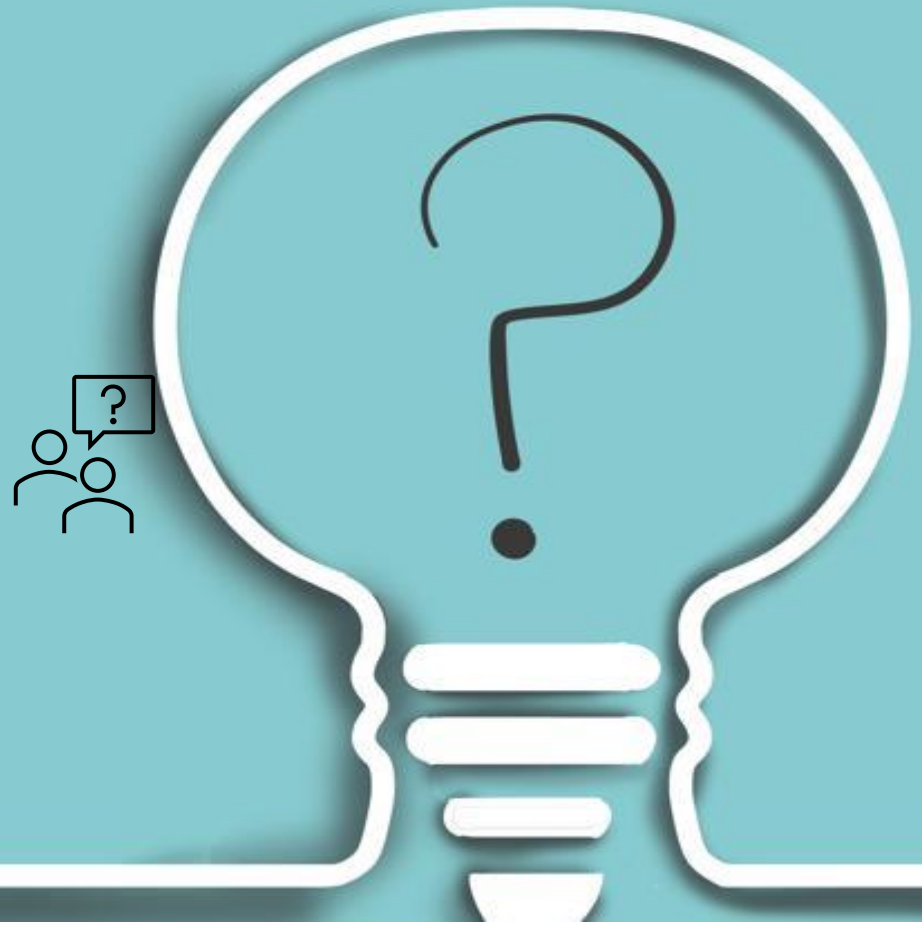
Fulfilment & Warehousing

- **Fulfilment**: Services include packaging & assembly, kitting, labeling, shrink wrapping, shipping and distribution (among others)
- **Warehousing**: Vendor managed inventory (VMI) which allows customer to print quarterly inventory upfront. Secured stored and then shipped as needed

Production Options

- Equipment
- Partner with existing folding carton company

Questions?



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