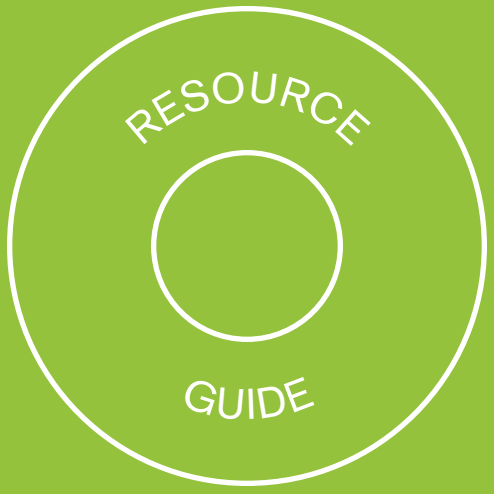
OLIVER INC.
CREATIVE PACKAGING SOLUTIONS

FOLDING CARTONS



INTRODUCTION

This guidebook provides the reader with a basic understanding of folding carton designs and terminology used throughout the industry. Our goal is to improve communications and understanding customer requirements through the use of a common language. This will make it easier to define specifications and provide an understanding of the application and utility of commonly used carton styles and designs.

OLIVER INC.
CREATIVE PACKAGING SOLUTIONS

At Oliver, we've combined companies that are masters of their craft and passionate about the packaging and printing industries to create an industry powerhouse under the Oliver name. This includes manufacturing operations in multiple production facilities, with over 250 years of combined experience in producing folding cartons, marketing collateral and labels. Our companies are equipped with advanced capabilities that include offset, flexographic and digital printing, specialized coatings, cold foil, hot foil stamping, bindery, and folding carton converting. Most importantly, our people have the knowledge and experience to service the critical needs of brands across all of our markets.

Our Core Purpose: Making a positive difference in the lives of our employees, customers, and communities.

Our Niche: We are committed to providing creative, competitive, and reliable packaging and print solutions that drive sales and peace of mind for our customers.

CONTENTS

THE DESIGN PROCESS

In today's intensely competitive consumer environment, a package is considerably more than a simple enclosure or container for a given product. As marketers compete for shelf space and consumer dollars, packaging has become a dynamic, high-performing marketing tool. Folding Cartons still represent a considerable portion of consumer product packaging and is an active part of point-of-sale marketing. The folding carton protects the product, educates the buyer, and attracts the consumers' attention, all to close the sale.

From a design perspective, the creation of a package involves two distinct but intimately related workflows representing structure and graphic design. And, while graphics continue to play a critical role in boosting a product's visual appeal, the practical and functional advantages of a well-engineered package should never be discounted. The structural design team plays an essential part in selling our products, and what follows is a brief overview of this process.

In designing a folding carton, our design team has a working knowledge of:

- Packaging materials characteristics
- Carton converting processes
- Packaging line requirements
- Handling process, including transport and storage demands
- Retailer requirements
- Consumer wants and needs
- Government Regulations
- Environmental Impact
- Finding the packaging components that best fit the demands of the product

Our team can help determine if a standard carton design is appropriate or a custom solution is required. This is why it is so important to gather as much information about the carton's use and necessary characteristics as possible before we start a design.

PRIMARY DESIGN CONSIDERATIONS

Paperboard

Paperboard is a grade of fiberboard specially manufactured to withstand creasing. In other words, it will bend or fold without cracking. It is often smoothed and coated to give it a superior printing surface.

Paperboard is made primarily of cellulose fiber derived directly from trees (virgin stock) or waste paper products for recycled content (recycled fibers). Paperboard is generally distinguished from a paper primarily based on thickness. Most mills classify paperboard as any thickness exceeding 10-point or 12-point. The thickness of paperboard is expressed in thousands of an inch and is measured using a caliper. You will often see paperboard described as 10-point (pt.), which refers to points on a caliper's display or .010 which translates to 10 thousands of an inch.

The more common types of paperboard include Solid Bleached Sulfate (SBS), which refers to paperboard comprised of fully bleached virgin pulp (sulfate process) fiber. Bleaching the pulp fibers provides an appealing high brightness and is topped with a clay coating. Recycled paperboard generally used in printed folding cartons is Clay-Coated one-side, which provides a relatively smooth surface for print, and the uncoated side will appear gray or brown depending on the fibers used.

Common Grades:

- SBS - Solid Bleached Sulfate, Coated one-side (C1S)
- TMP - Thermal Mechanical Pulp, Coated one-side (C1S) *
- SBS - Coated two-side (C2S)
- CCNB - Clay Coated News Back will appear either tan or gray back (depending on the fiber used) Clay coated front (C1S)
- CCLB - Clay Coated Light Back Light gray back clay-coated front (C1S)
- CCKB - Clay Coated Kraft Back or Brown Back clay-coated front (C1S)
- BC - Bending Chip Brown both sides uncoated
- SUS - Solid Unbleached Sulfate coated front (C1S)

*TMP comprises middle layers of mechanical pulp sandwiched between outer layers of chemical pulp. The top layer of chemical pulp is bleached and pigment coated. The back of the paperboard is cream (manila) in color. This is because the back layer of bleached or unbleached chemical pulp is translucent, allowing the color of the middle layers to influence the appearance.

There are specialty paperboards that are laminated with silver Mylar, rainbow holographic, and patterned foils. Specialty paperboards are created for a variety of functions from aesthetics and functionality to enhancing the carton's environmental considerations. This is all part of asking the right questions up front, so the designers get the complete picture, and the customer gets what they need.

Grain Direction

Grain is the longitudinal arrangement of the fibers in paper or paperboard which results as they settle in the direction parallel with the travel of the paper or board machine. Why is Grain Direction important? A clean crisp score is achieved by creasing across the grain and not with the grain. You will see the recommended grain direction listed on all the standard designs contained in this guidebook. Knowing the grain direction is an important aspect of planning and layout before the job is produced.

Paperboard Stiffness

Stiffness is one of the most important properties of paperboard as it affects the ability of cartons to run smoothly through the machine that erects, fills and closes them. Stiffness also gives strength and reduces the propensity of a carton to bulge under the weight of settling flowable contents such as cereal. When considering which stock to use you'll note the stiffness or rigidity of CCNB is less than SBS. The reason is the recycled fibers are broken and shorter, which weakens the board. Designers often opt for a higher caliper CCNB to make up for the reduced stiffness.

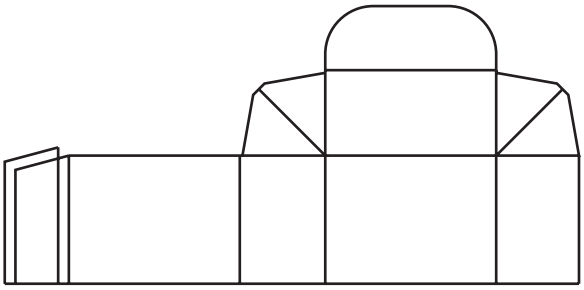
OTHER DESIGN CONSIDERATIONS

In addition to converter, customer and consumer requirements, other design considerations may include Federal, State, and Local Governmental Regulations and guidelines:

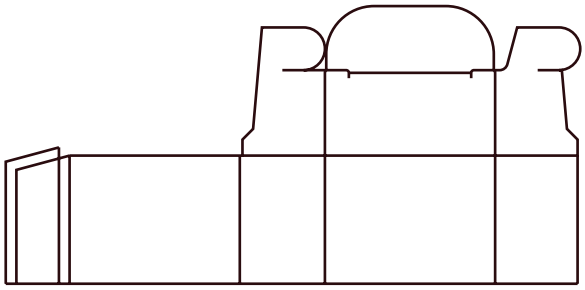
- Food and Drug Administration (FDA): health and nutritional claims. Nutritional Labeling Education Act (NCEA) Tamper Evident Packaging.
- Federal Trade Commission (FTC): environmental and advertising claims.
- National Conference on Weights and Measures (NCWM) Fair Packaging and Labeling Act (FPLA)
- Environmental Protection Agency (EPA)

FLAPS AND LOCKS

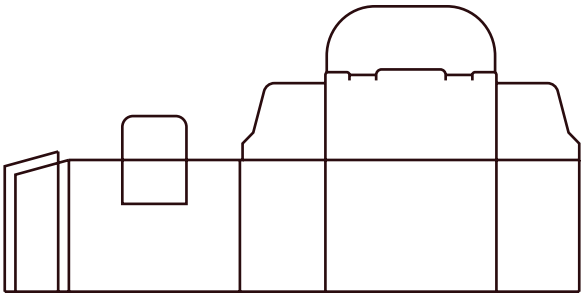
BELLOWS WEBBED OR GUSSETED DUST FLAPS



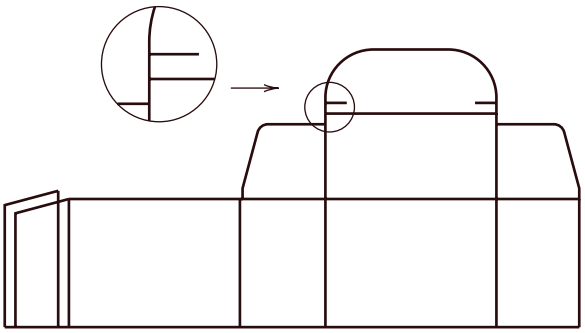
AUTHUR LOCKS



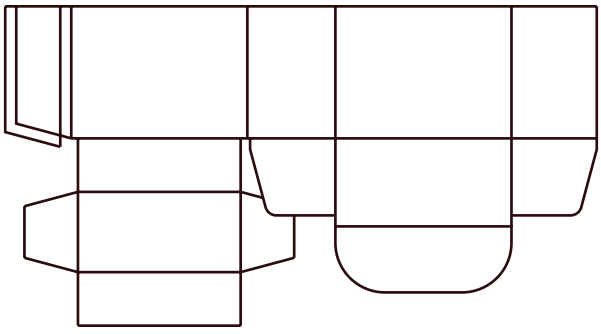
MAILER LOCK



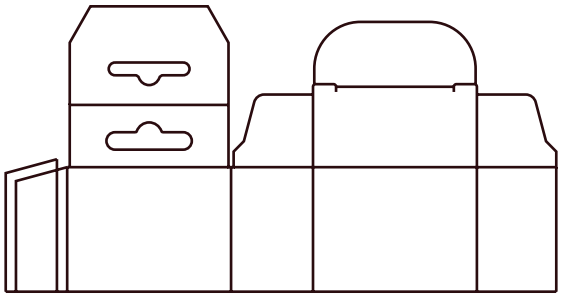
FRICTION CREASE



FALSE BOTTOM OF INTERNAL (MUSHROOM)



HEADER



CUTS, SCORES, PERFS

CUT

The paperboard is cut through 100% from outer (clay) surface. Typical uses:

1. To separate blank from base sheet.

2. To separate blank into individual component parts.

3. To be incorporated into other means of scoring paperboard; i.e., cut and crease or perforation type lines of weakness.

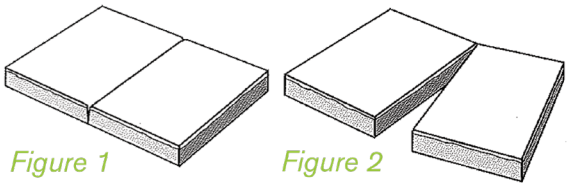


Figure 1 *Figure 2*

CREASE SCORE a.k.a. BAR SCORE

A controlled line of weakness created by depressing a round head steel rule into the paperboard, typically from a fold line with an unbroken outer surface. This is the most widely used method of creating fold lines between panels, flaps and tabs of the typical folding carton.

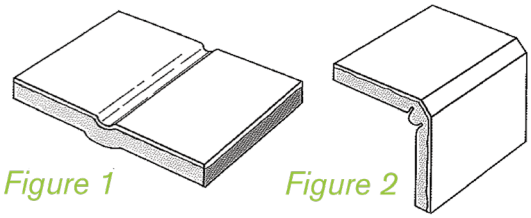


Figure 1 *Figure 2*

CUT SCORE a.k.a. HALF SCORE

An alternate type fold line to the crease score, cut approximately 50% through from the outer (clay) surface. Cut scores fold easily and cleanly, but interior fibers are exposed in the folded state. Cut scores are frequently incorporated into opening features; i.e., double cut score, or in combination with a perforation type line of weakness, to control accidental top surface delamination.

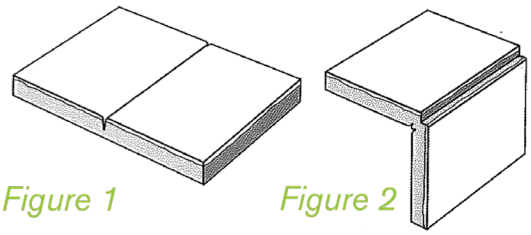


Figure 1 *Figure 2*

PERFORATION

A line of weakness comprised of intermittent cuts and spaces. Used as the primary type of scoring for reverse folding paperboard. Perforation may also be incorporated into various types of tear strips or opening features.

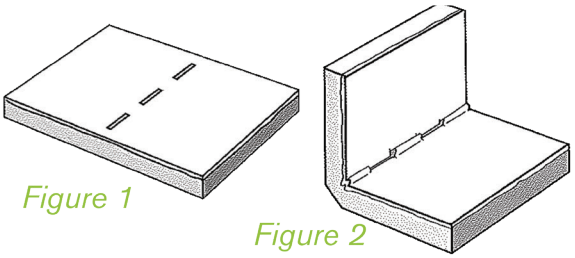


Figure 1 *Figure 2*

REVERSE CUT SCORE

An alternative to the perforation as a means of reverse folding paperboard. Cut approximately 50% through from the inside of the paperboard sheet.

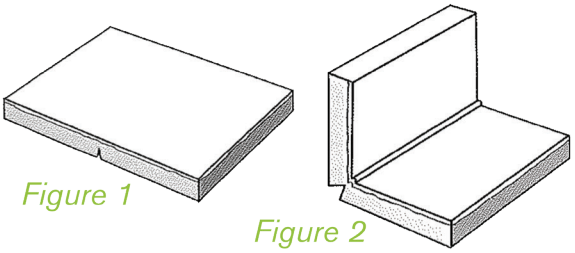


Figure 1 *Figure 2*

DOUBLE CUT SCORE

Pairs of offset and parallel cuts approximately 50% through from opposite sides of the paperboard sheet. Commonly used as a element of a tear strip as shown here, or incorporated into an opening feature.

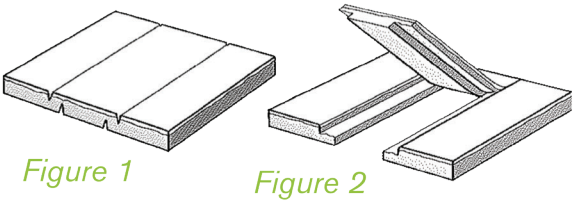


Figure 1 *Figure 2*

CUT and CREASE SCORE

An alternative to the crease score or cut score for forming a folding type line of weakness. Presents less resistance to folding than the conventional crease score, and is less prone to accidental top surface delamination than the cut score. Because the top surface is interrupted by cuts, this technique is generally limited to internal scores not visible when viewing the erected carton.

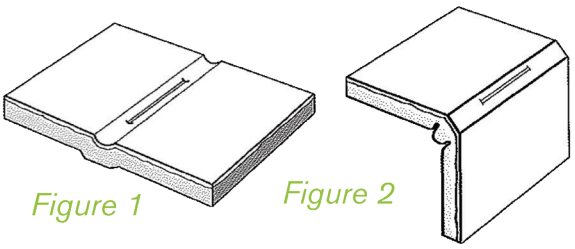


Figure 1 *Figure 2*

COMMUNICATING CARTON DIMENSIONS

Dimension Conventions

Dimensions, or measurements, for cartons in the tube and tray styles, and wherever possible in the multiple and specialty packaging styles, should always be expressed in the proper order of length, width, and depth (LxWxD). It should be noted that dimensions are also expressed as AxBxC (A: Length, B: Width, C: Depth). Length, width, and depth should be measured as follows:

- Length and width are measured at the open or fill end of the carton.
- Length is usually the larger dimensions at the open end of the carton, or the dimension that will be the front of the carton (in some instances it may be the smaller dimension, e.g., a counter display). Length, or "A" dimension, should be expressed first.
- Width, or "B" dimension, is usually the smaller dimension, should be expressed second.
- Depth, or "C" dimension, is the distance between the open ends of a tube, or from the open end to the bottom of the tray. Depth should be expressed third in order.

All dimensions, unless otherwise stated, are measured from center of score to center or edge of carton blank. We'll focus on two basic carton designs: Tube Style and Tray Style. The standard dimensions (L,W,D) for each style are illustrated on pages 11 and 12. Specific designs within Tube and Tray styles are shown on pages 13 to 25

Fundamental Carton Elements

The fundamental elements of a folding carton are the panels, flaps and tabs.

Panels

The major component parts of a folding carton which define the major outer or partition elements. Example: A simple four-sided tube is comprised of a front, rear, left and right side, top and bottom PANEL.

Flaps

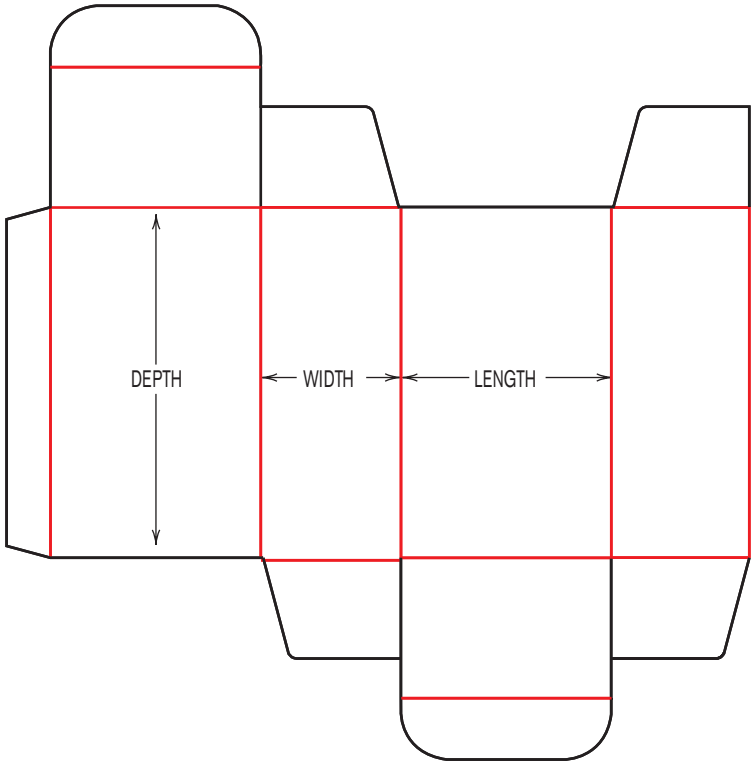
A secondary carton element hinge-connected along a free edge of a panel or another flap. Example: A simple four-sided tube with a tuck end closure top and bottom includes:

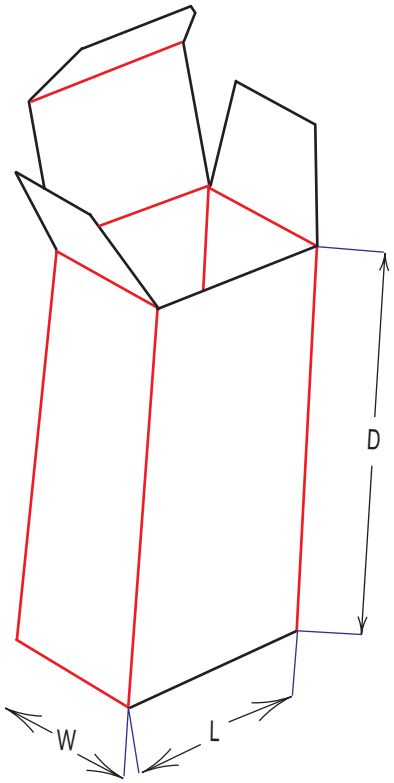
- A GLUE FLAP attached to the free edge of the rear PANEL.
- DUST FLAPS attached to upper and lower free edges of the left and right side PANELS.
- TUCK FLAPS attached the outer free edges of the top and bottom closure PANELS.

Tabs

A tertiary carton element hinged to a portion of a free edge of a PANEL or FLAP or struck from without the plane of a PANEL or FLAP. Example: A double wall Simplex tray has locking TABS hinged off a portion of the free side edges of the inner end PANELS. The side loaded tube style carrier has partition TABS struck from within the bottom PANEL.

TUBE STYLE CARTONS





COMMUNICATINGCARTON DIMENSIONS

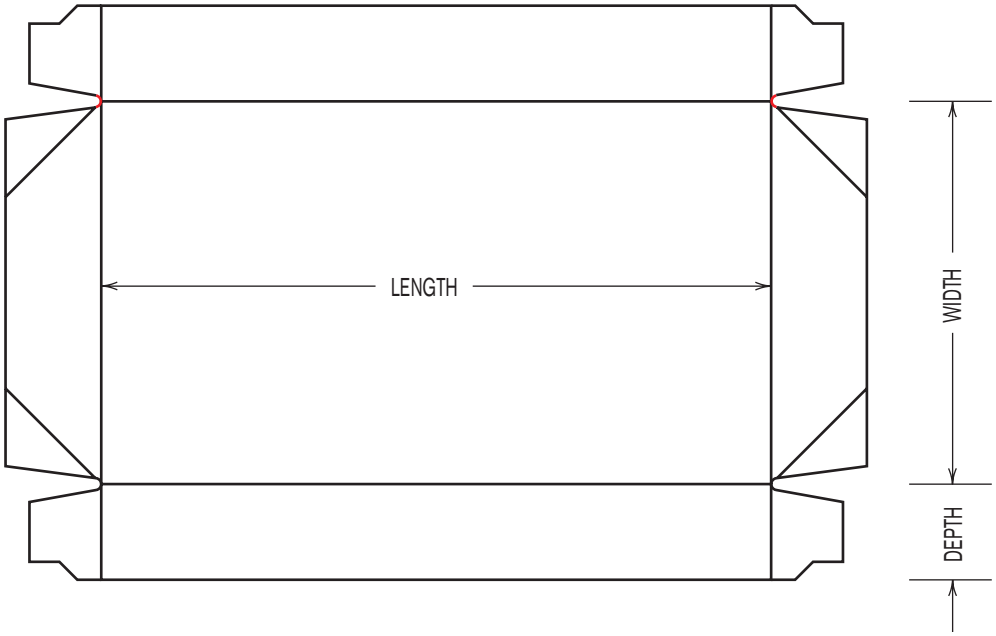
L x W x D

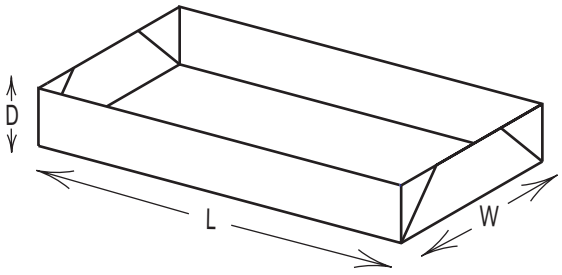
L = ACROSS FRONT PANEL (LENGTH)

W = ACROSS SIDE PANEL (WIDTH)

D = TOP TO BOTTOM OF FRONT PANEL (DEPTH)

TRAY STYLE CARTONS





COMMUNICATING CARTON DIMENSIONS

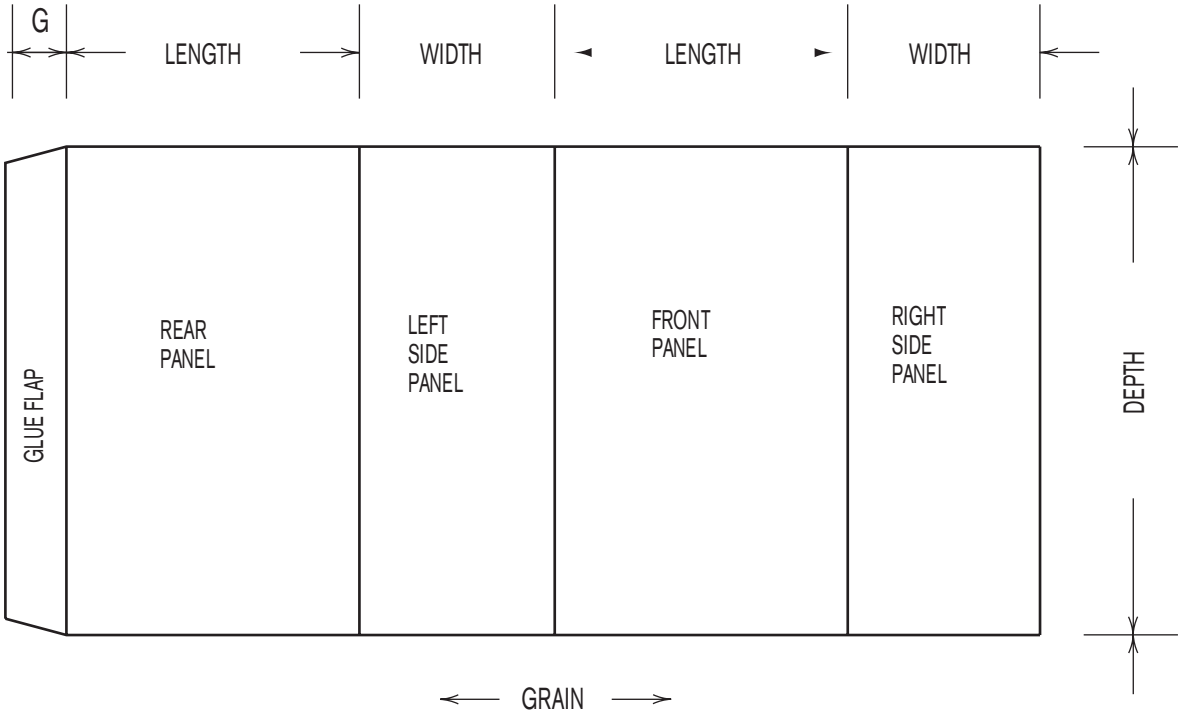
L x W x D

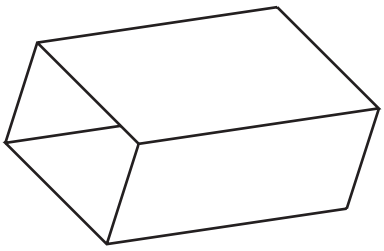
L = ACROSS FRONT PANEL (LENGTH)

W = ACROSS SIDE PANEL (WIDTH)

D = TOP TO BOTTOM OF FRONT PANEL (DEPTH)

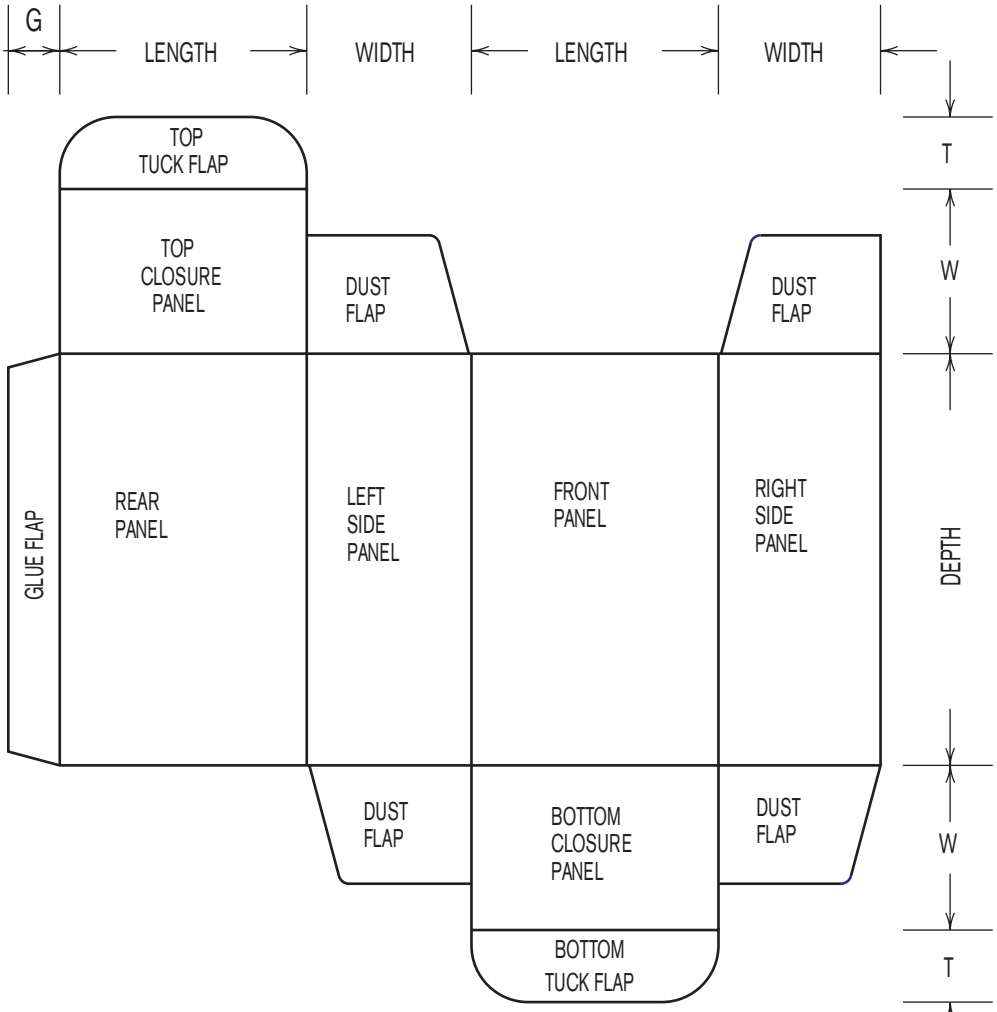
OPEN END TUBE

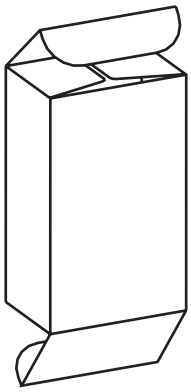




OE - OPEN END SLEEVE

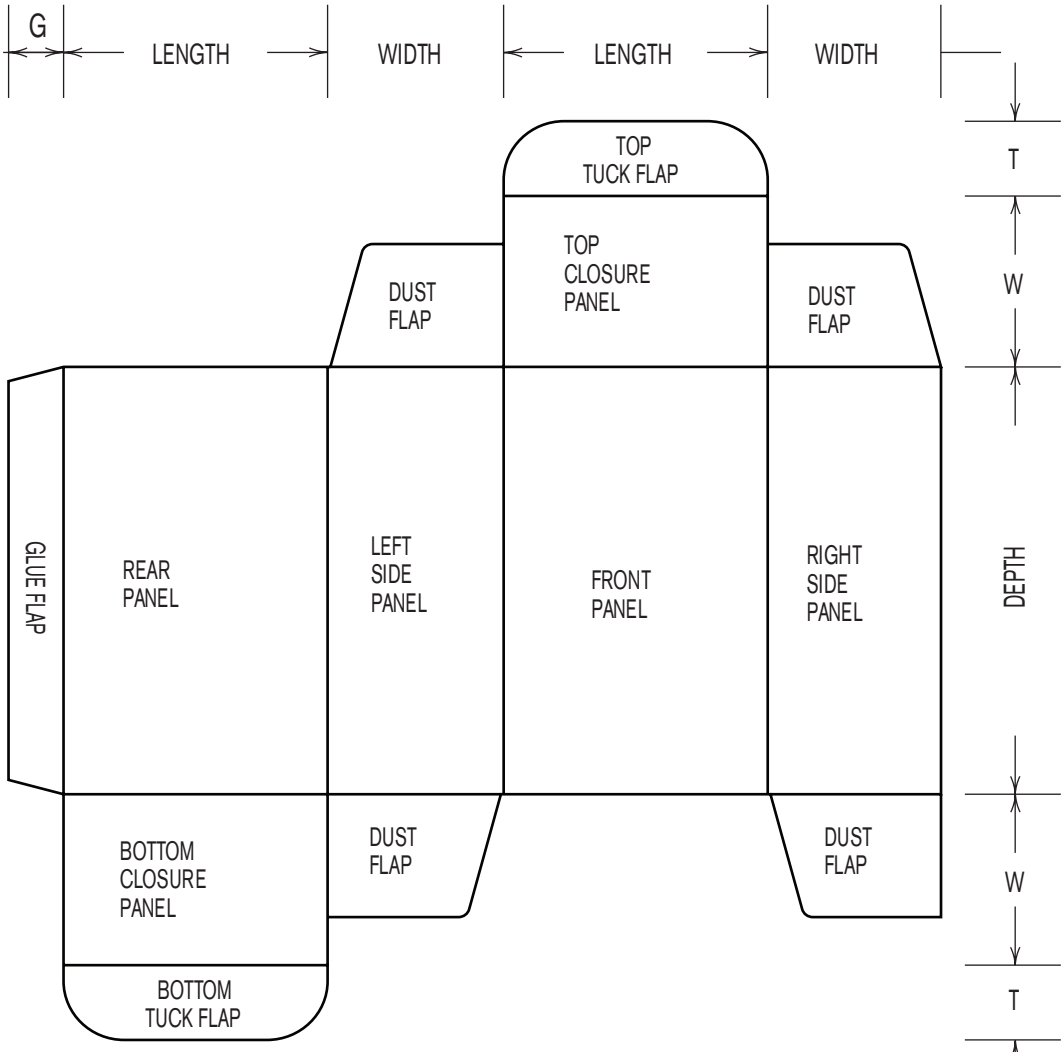
STANDARD REVERSE TUCK (SRT) CARTON

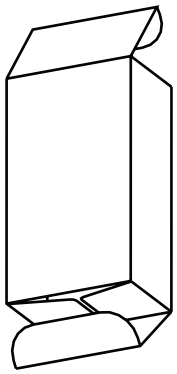




RTE - Standard
(RTE - Reverse Tuck End)

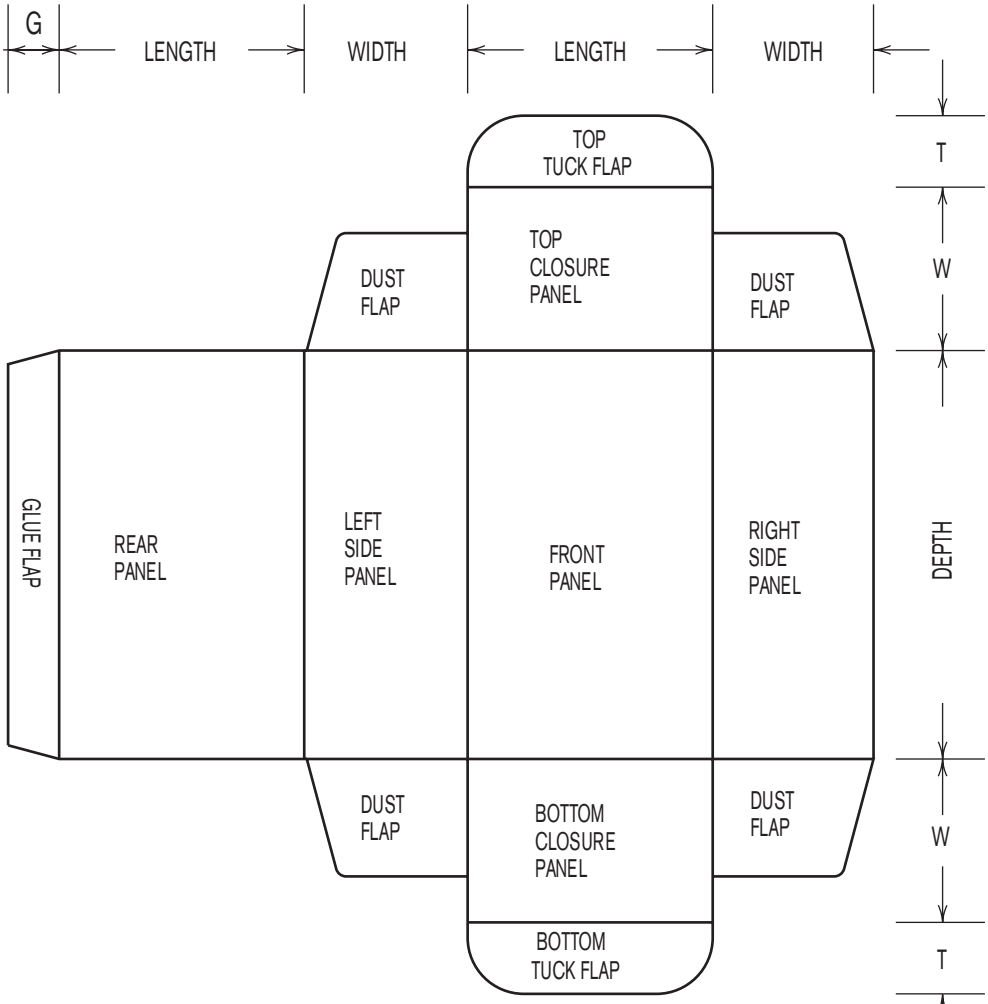
FRENCH REVERSE TUCK (FRT)

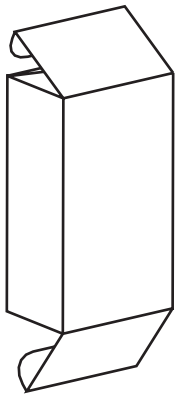




RTE - French
(French RTE - French Reverse Tuck End)

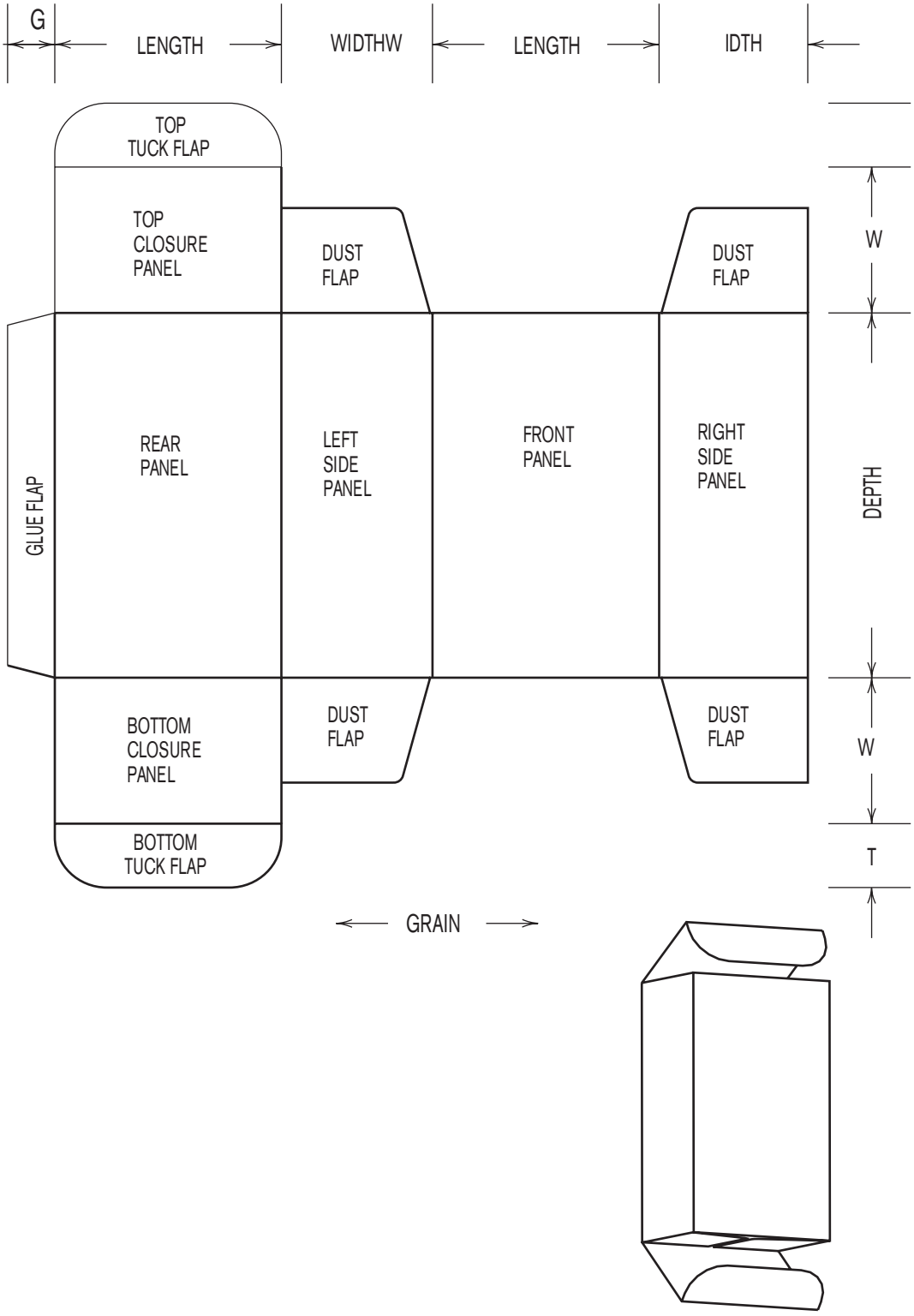
STANDARD STRAIGHT TUCK (SST)





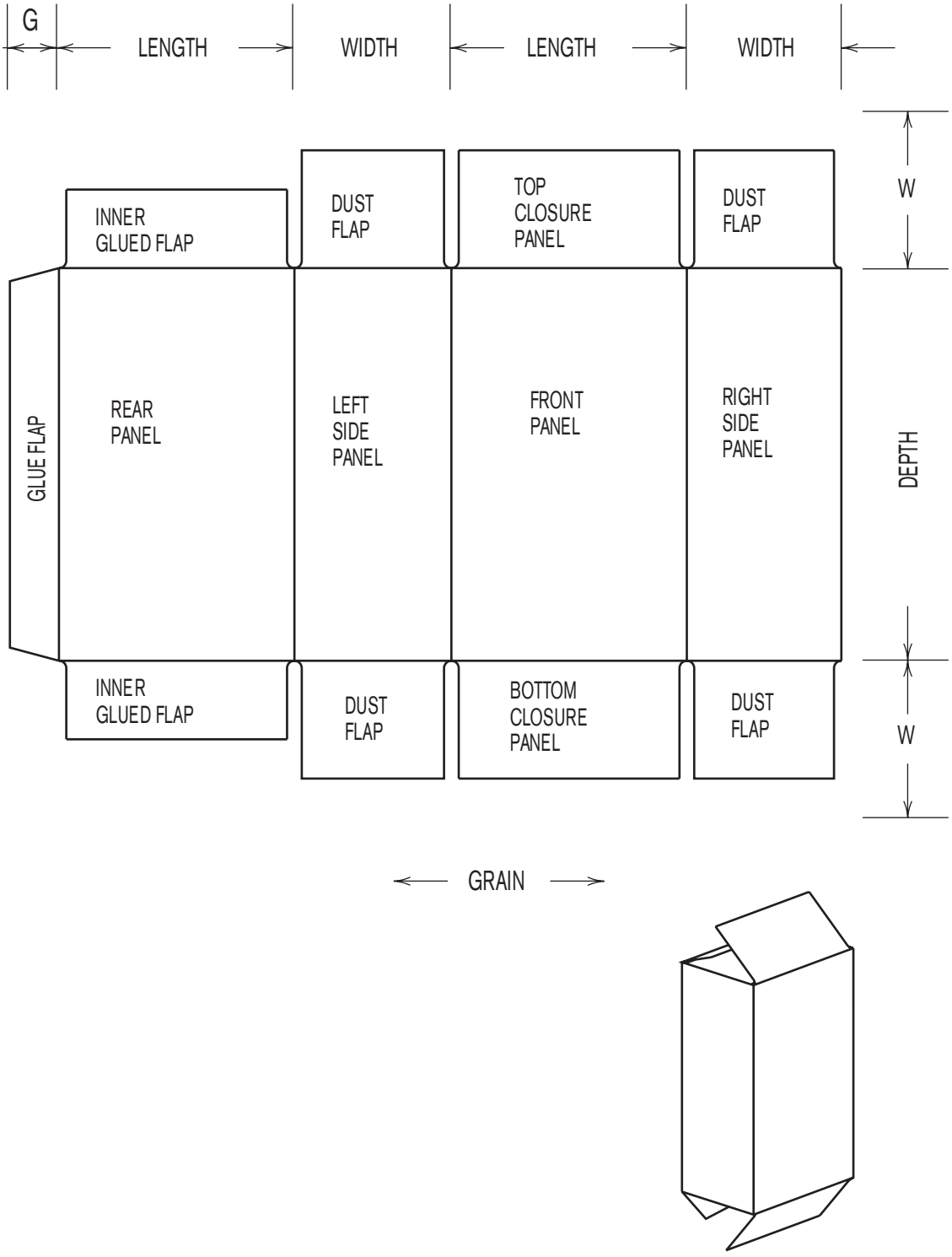
STE - Standard
(STE - Straight Tuck End)

AIRPLANE STYLE STRAIGHT TUCK



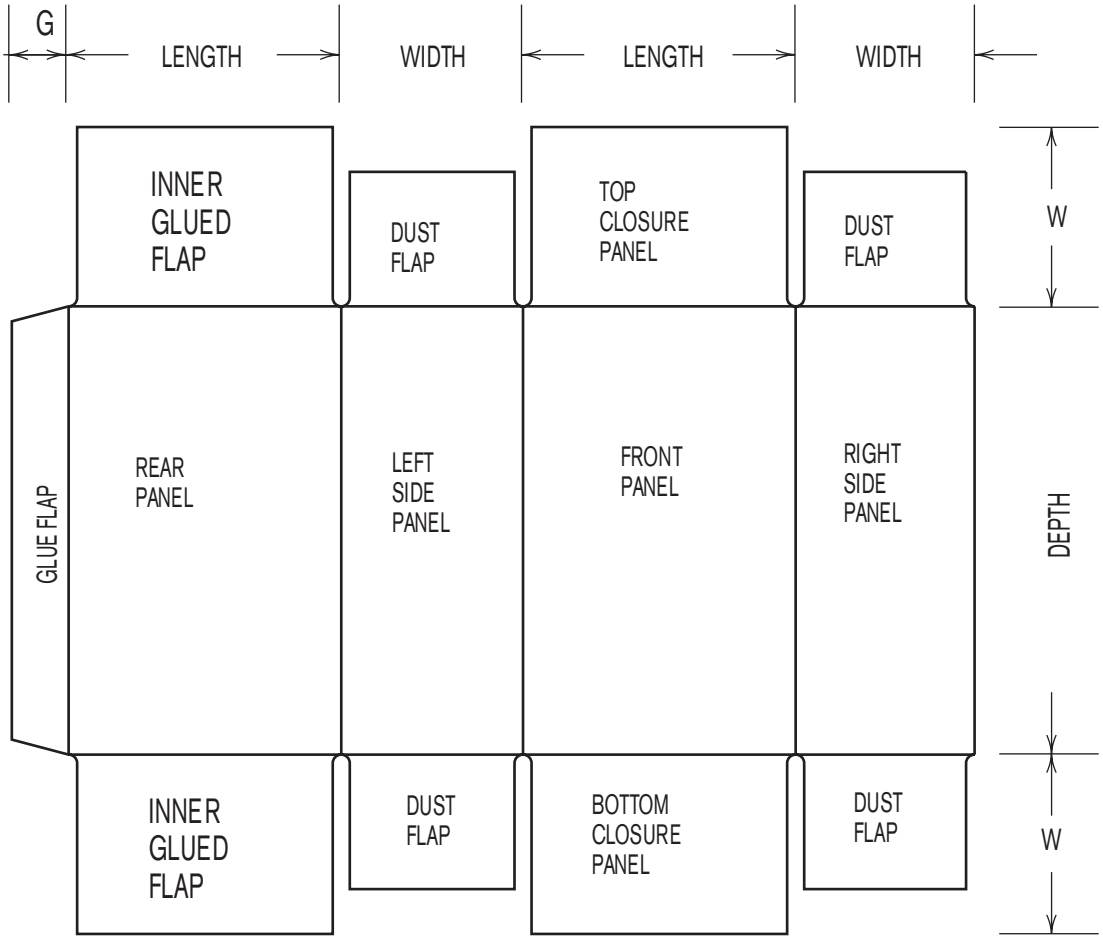
STE - Airplane

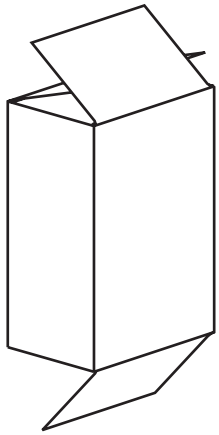
SEALED END PARTIAL OVERLAP



SE - Partial Overlap (SE - Seal End)

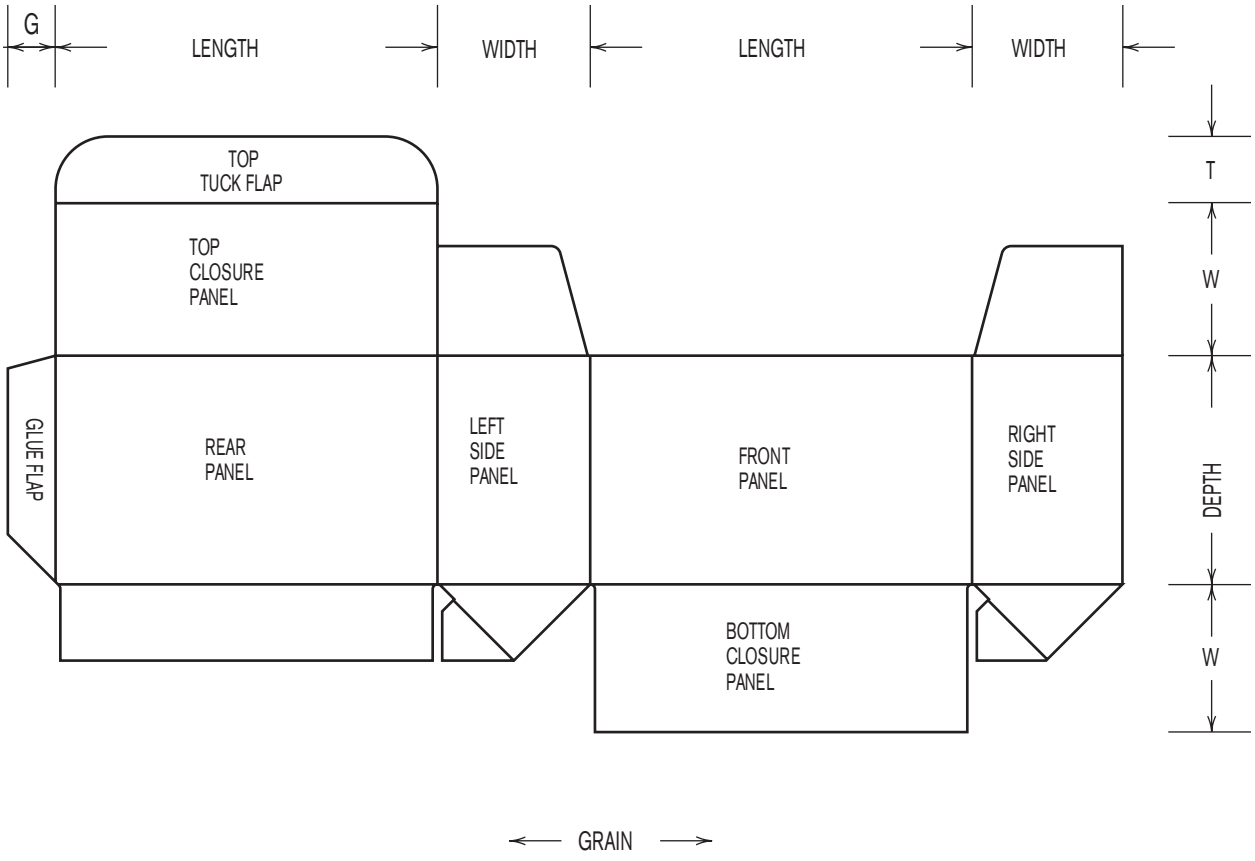
SEALED END FULL OVERLAP

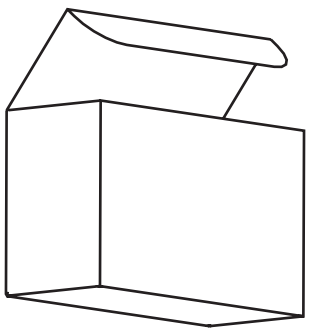




SE - Full Overlap

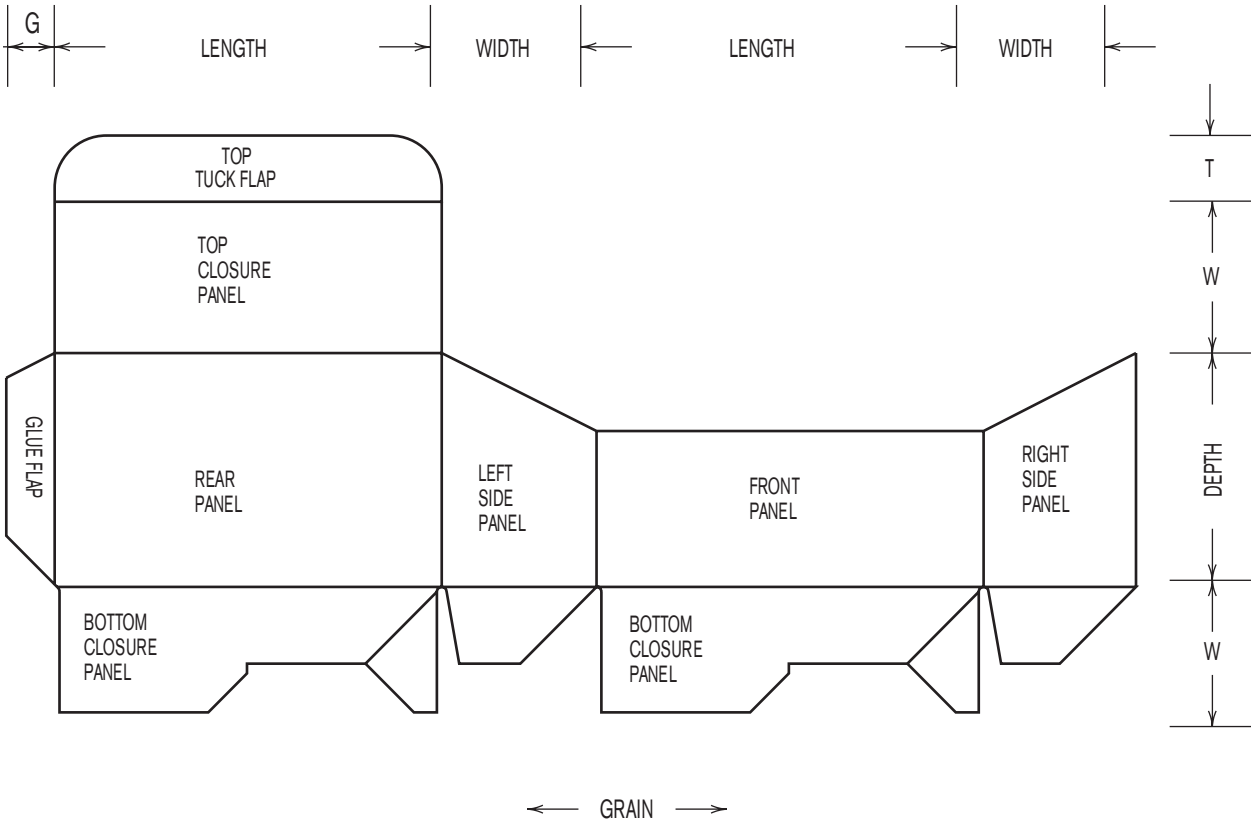
FULL AUTO GLUED BOTTOM
A.K.A FULL FLAP AUTOMATIC BOTTOM BOTTOM

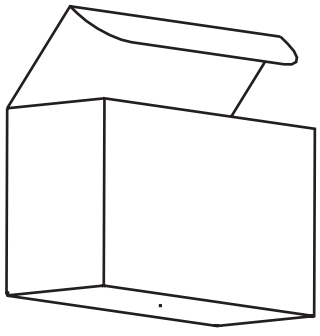




AB - Full Flap (AB Auto Bottom)

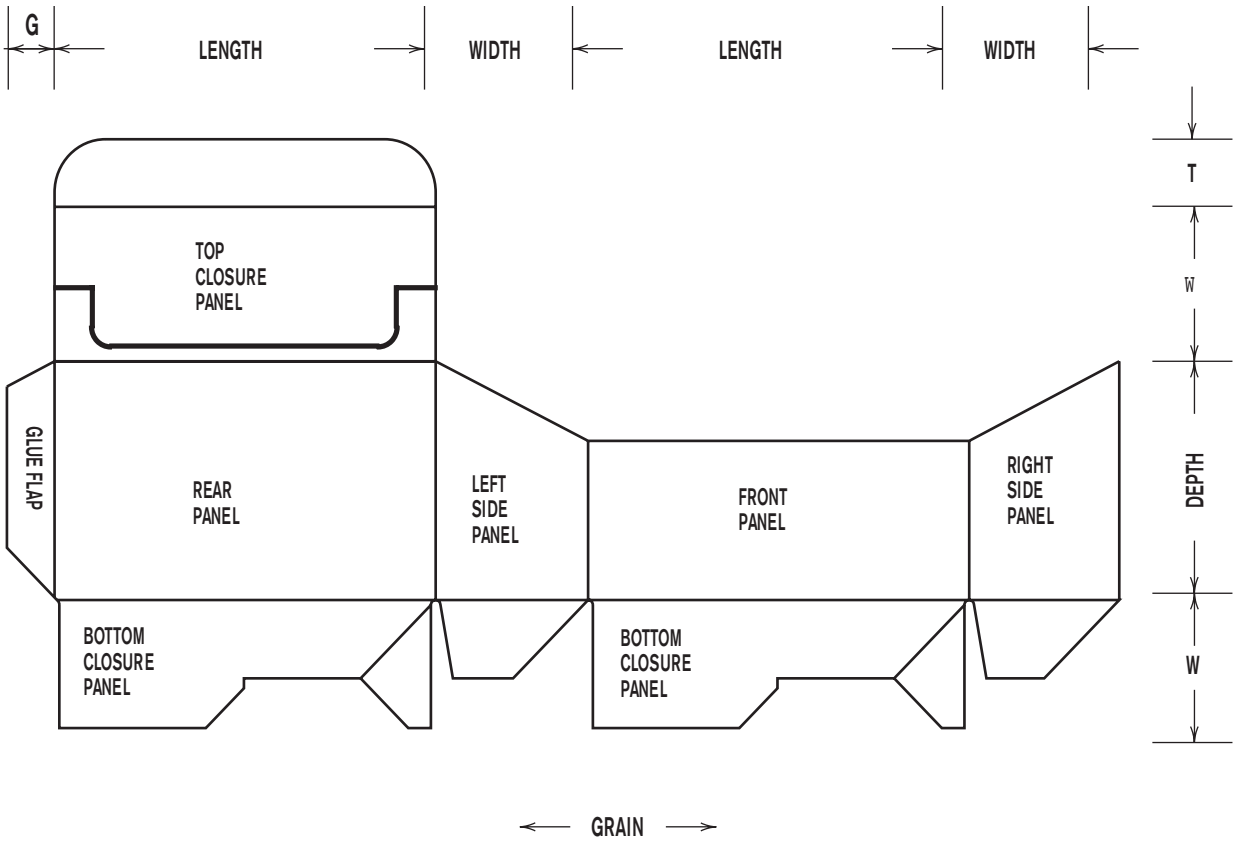
HIMES LOCK, AUTOMATIC BOTTOM
(A.K.A. CRASH LOCK, ECONOMY OR POPCORN BOTTOM)

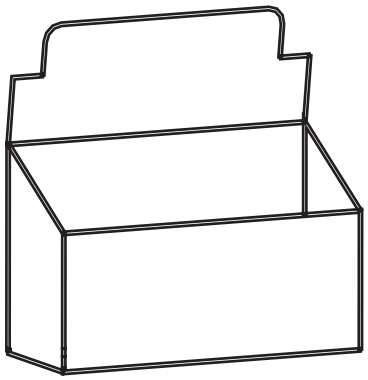




AB - Himes Lock (AB Auto Bottom)

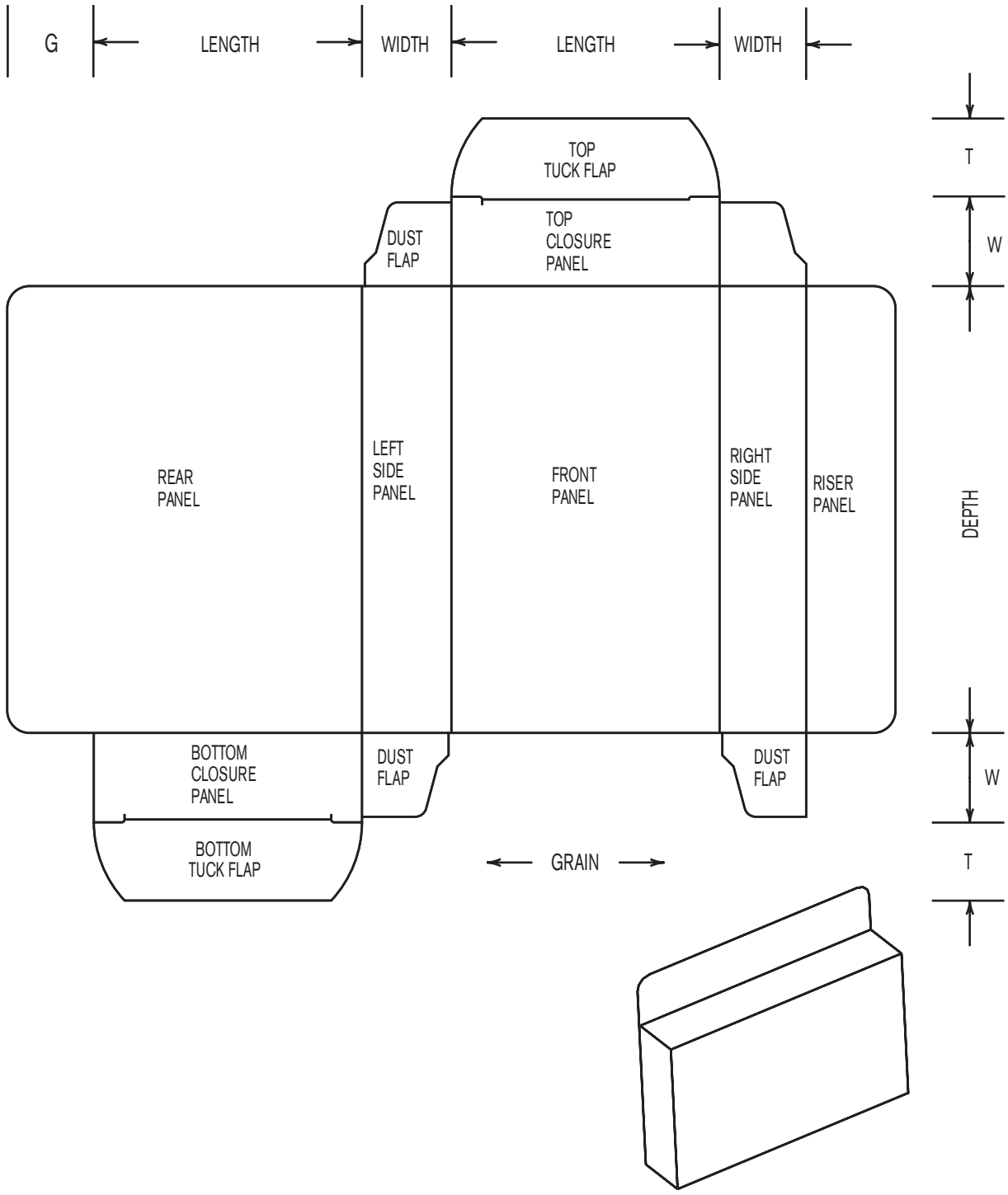
AUTO BOTTOM DISPLAY PACKER





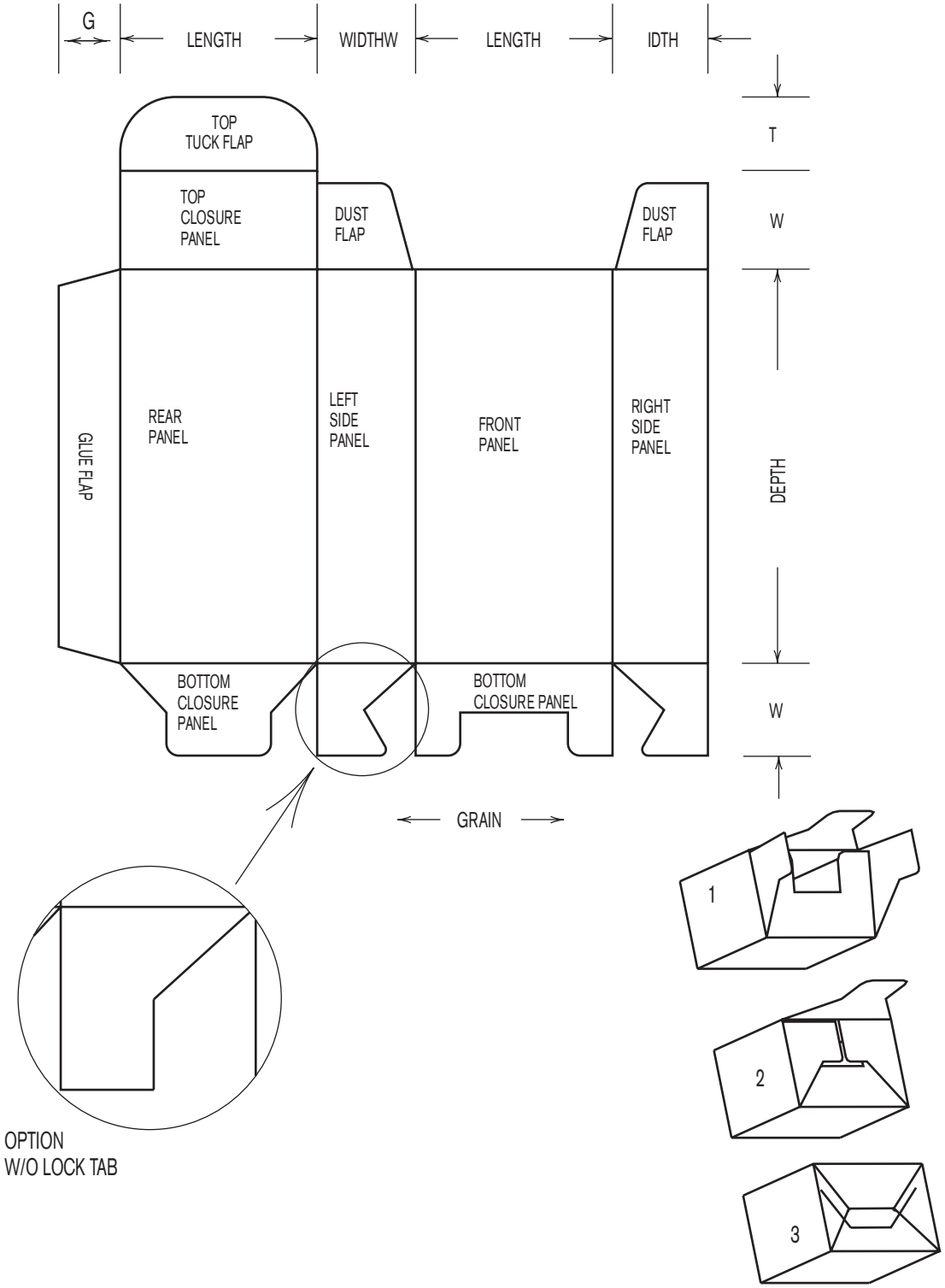
AB - Display Packer

5TH PANEL CARTON



Flat 5th

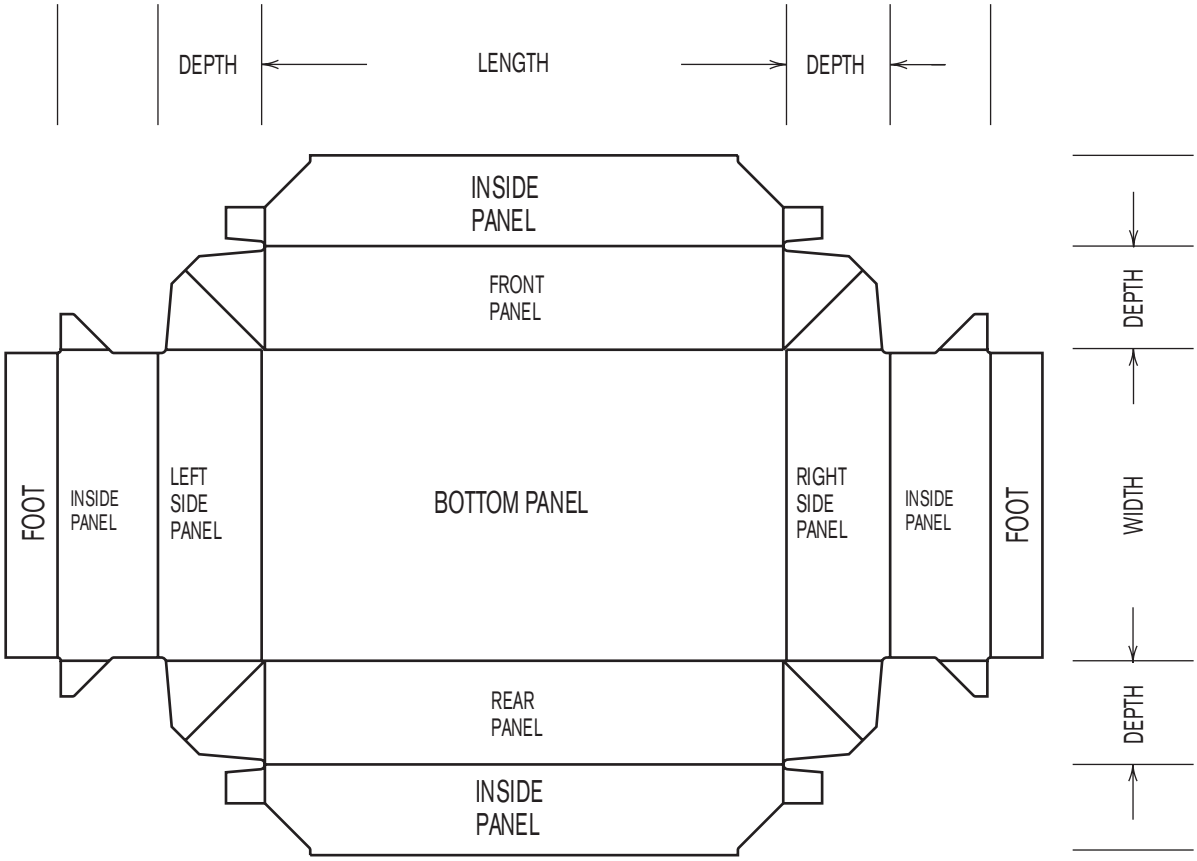
123 BOTTOM
SNAP LOCK OR HOUGHLAND

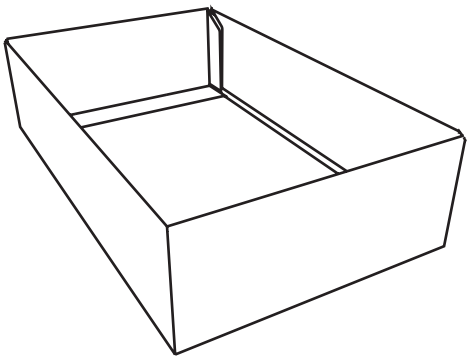


123 - Snap Lock

(123 - Snap Lock 123 Bottom)

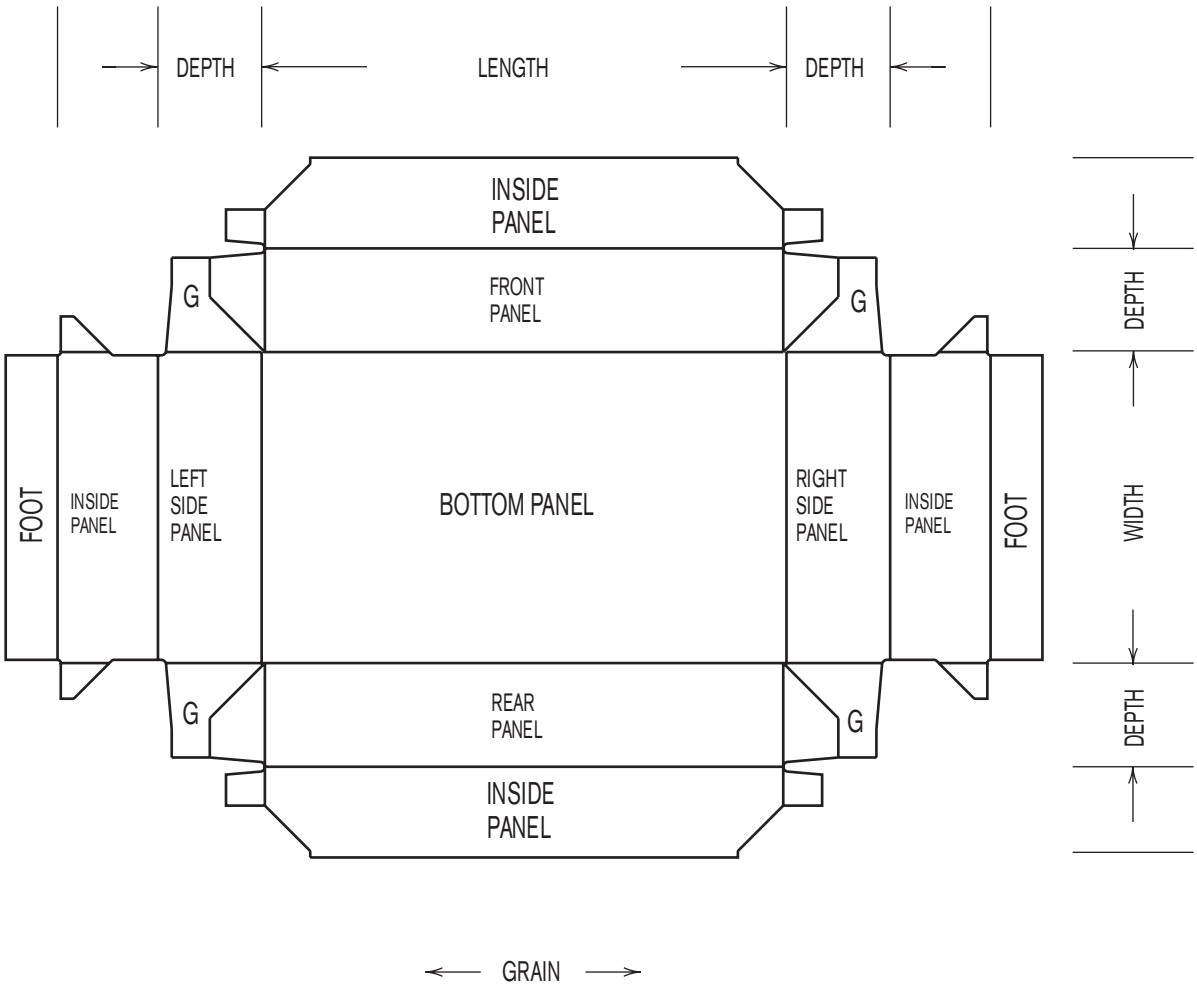
SIMPLEX (KWIKSET) TRAY

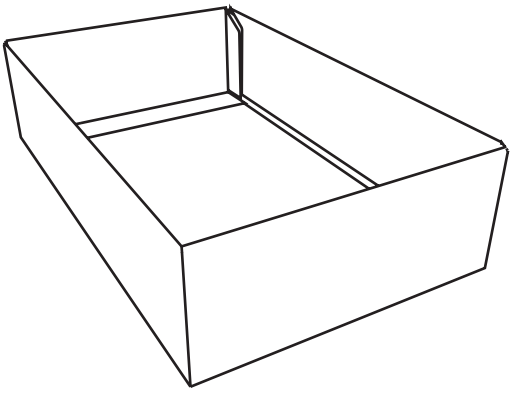




Tray - Simplex

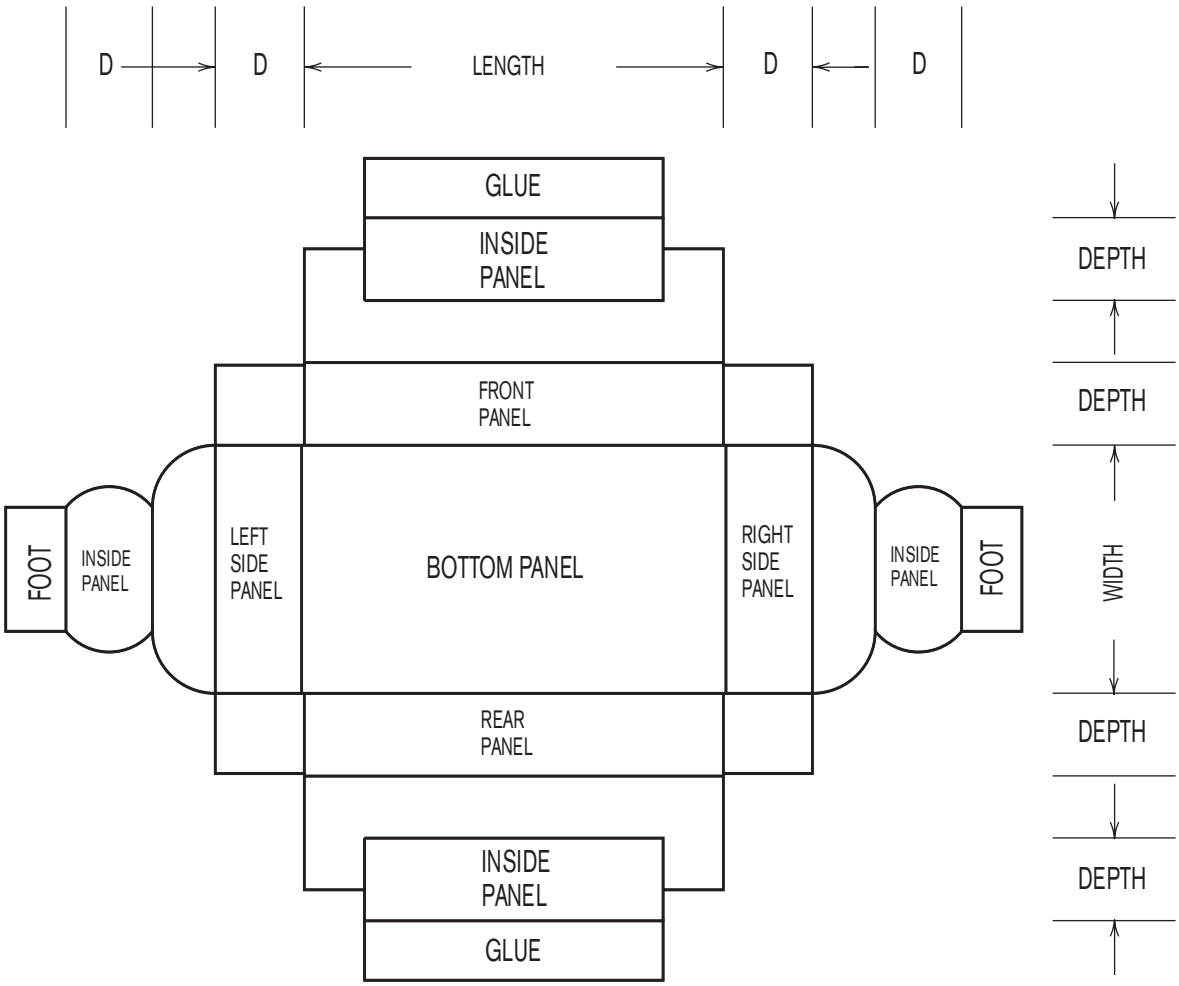
SIMPLEX TRAY WITH GLUED WEBBED FLAPS

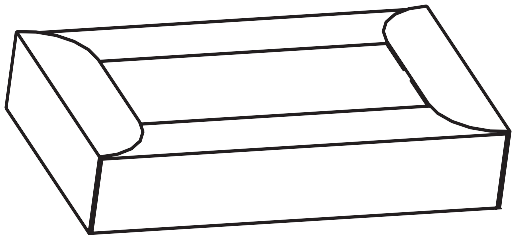




Tray - Simplex - Glued WF

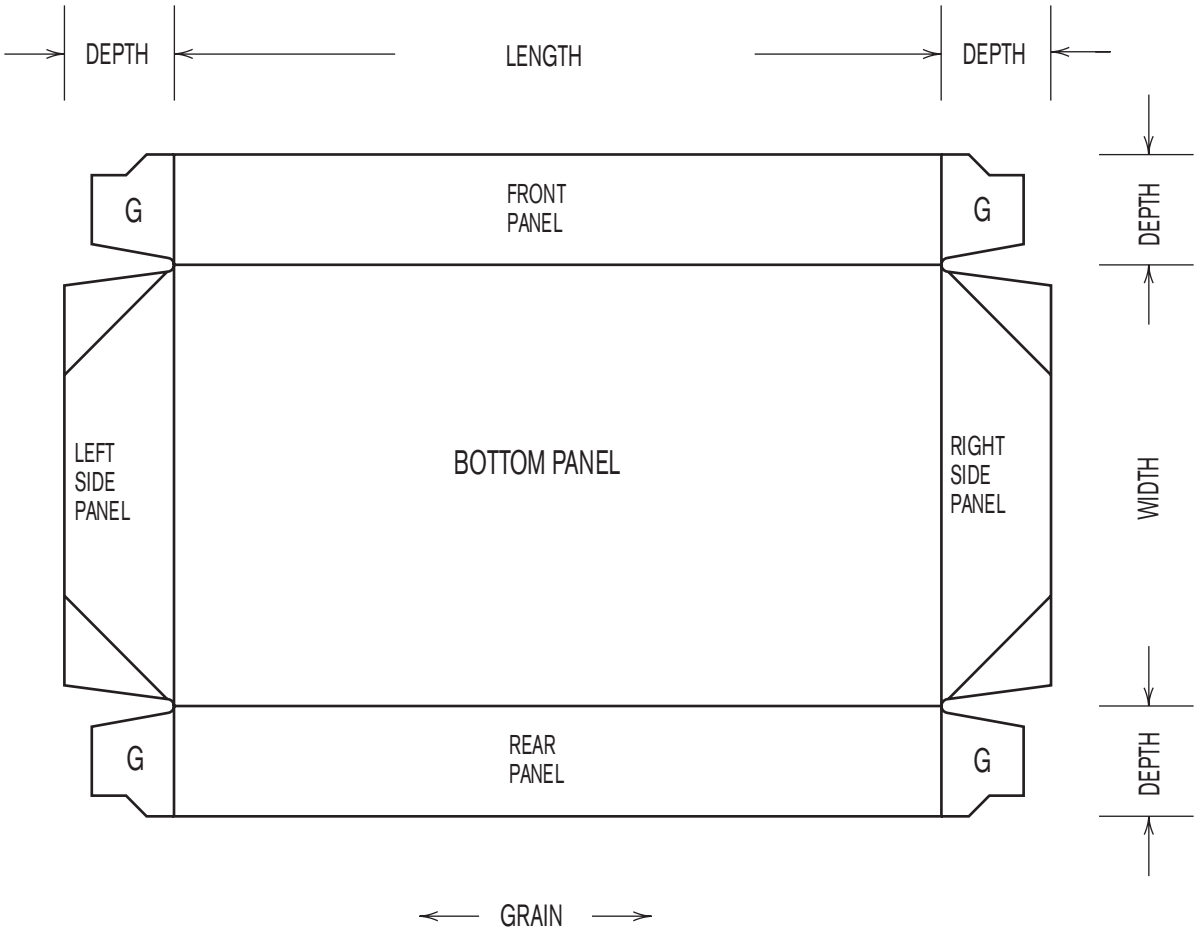
FRAME-VUE TRAY (A.K.A. FRAME VIEW TRAY)

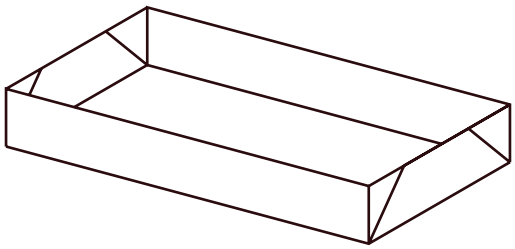




Tray - Frame - Vue

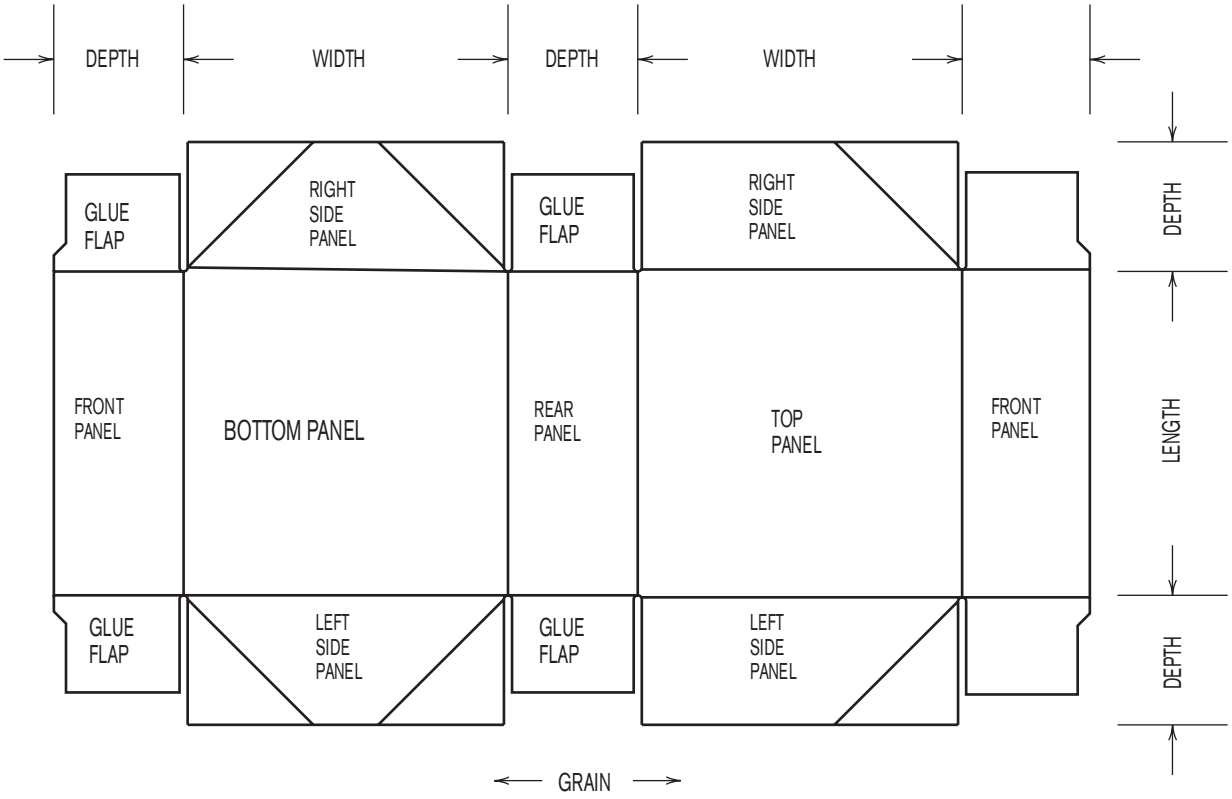
4 CORNER BEERS TRAY (A.K.A. 4 COURNERS BIERS TRAY)

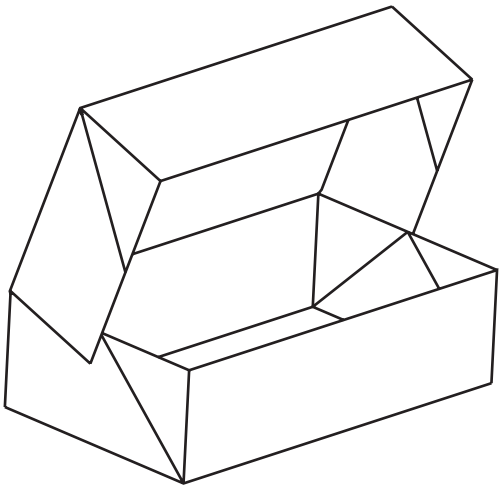




4 CORNER BEERS TRAY
(A.K.A. 4 CORNER BIERS TRAY)

6 CORNER BEERS TRAY (A.K.A. 6 CORNER BIERS TRAY)





Tray - 6 Corner Beers

OLIVER INC.

CREATIVE PACKAGING SOLUTIONS

oliverinc.com