PLEXFORM PACKAGING SERVICES INC.

5 Amazing Design Solutions To Optimize Logistics, No Matter The Volume Size!

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INTRODUCTION

When it comes to logistics in regards to shipping manufactured component parts, it's essential that a custom packaging design is produced specifically tailored to each unique part. The holding mechanisms used in all designs shall hold the part firm while in transit thus allowing the product to arrive safely to its destination.

The quantity of manufactured component parts (known as density) each package shall occupy is totally depended on the size, shape, texture, and weight of the part. In some cases, the customer will issue a target density to acquire, therefore, limiting the amount the package will hold to a specific quantity (even if you can achieve a higher quantity).

Every component is treated different when it comes to packaging. Some parts require additional protection due to the part being extremely delicate, while other parts require little to none. Weak points on a component are also taken with vigilant measures, as these areas are to be avoided when designing and building the holding mechanism in the package.

In this report, we will illustrate 5 amazing various methods to optimize logistics. Efficiently shipping a bulk quantity of manufactured component parts safely from point A to point B can save any company a large sum of money, either from avoiding expensive product damage or successfully delivering an above expectations quantity amount.

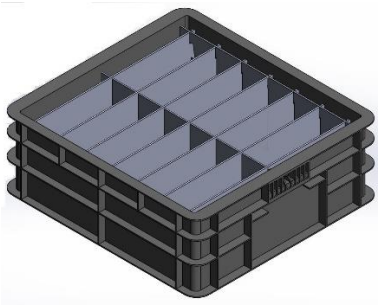
CHAPTER 1: DETERMINING THE BEST CONTAINER OPTION

The overall size of the package will be determined by the size of the part and the target density (the larger the part with a higher target goal consequently means the larger the package will be).

There are many different material handling container options to choose from when you need to accommodate for the part size:

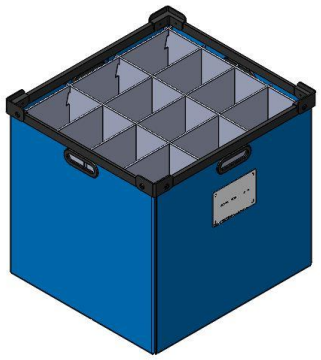
1. *Hand held plastic tote container*

- Small parts are recommended to be assembled and packaged in hand held tote containers.
- Typically there will be Interior dunnage designed and manufactured and fastened inside the container to secure the component in transit.
- Plastic corrugated dividers are the common choice to separate parts in the container during the loading process. Other options like fabric inserts can also be utilized to create pockets for each part (known as cells).
- Container sizes vary but the most common size utilized is the 24” (Length) X 22” (Width) due to its efficient storage capacity when loaded on pallets. These containers are stacked high to achieve a greater volume.



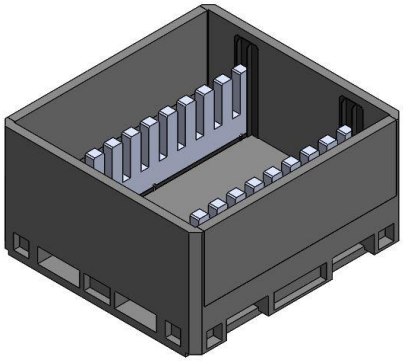
2. *Custom size tote container*

- In addition to the various standard size tote containers, a custom size tote can be assembled to accommodate non-standard size containers.
- Stacking corners are incorporated in all custom built containers to enable the stacking function for optimal storage results.



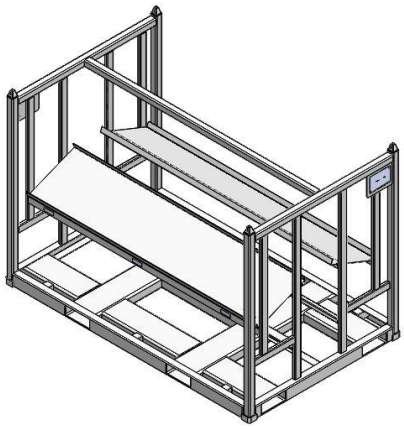
3. Bulk bin plastic container

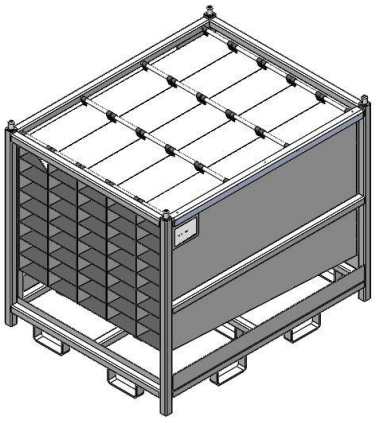
- Large parts are recommended to be assembled and packaged in bulk containers.
- The bulk containers have a wide variety of selection when it comes to overall sizes but the most common size utilized is the 48” (Length) X 45” (Width) X 50” (Height) due to its efficient storage capacity when fully loaded in a truck. These containers are stacked high to achieve a greater volume.
- There is a top load and side load options with the top load being the more cost effective solution.
- The bottom of these bins contain pockets for the forklift forks to enable easy movement and stacking of these containers.
- Interior dunnage such as crosslink foams, plastic corrugated sheets and fabric inserts are the best choice for the bulk bins when producing the holding mechanism.



4. Custom steel fabricated racks

- Small and large parts can both be a great fit in a uniquely designed and fabricated custom rack.
- Any size can be manufactured to assure the best fit possible. However, a common width dimension is 48” to effectively place these racks side to side in the freight trailer.
- The stacking caps on top of the corner posts enable these racks to stack high to achieve a greater volume and optimize storage space in all facilities.
- Fabric bags, vacuum formed trays, HDPE/UHMW plastics, and formed channels with XLPE foams can be used to create the holding mechanism for various component parts.
- The bottom of these racks typically contain pockets for the forklift forks to enable easy movement.





CHAPTER 2: COMMON MATERIALS UTILIZED

The materials utilized in all designs are essential to achieve a reliable and robust package. High quality materials along with substantial fabrication and assembly provides durable and long lasting packaging for the future years to come.

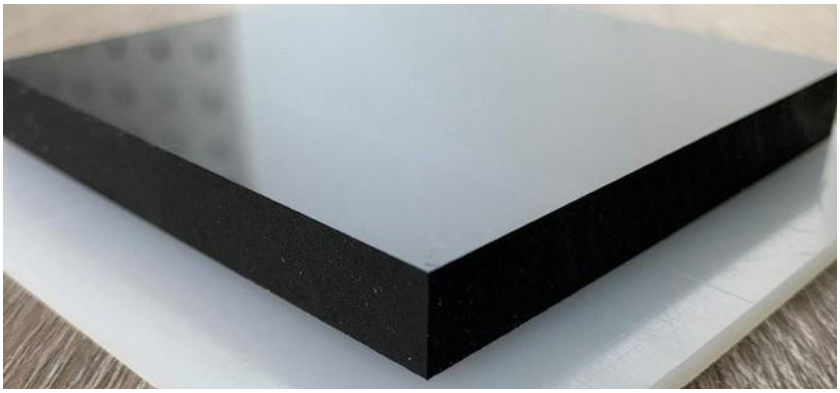
There are a variety of selections implemented to build any material handling product, see below for all examples:

Steel (hot rolled steel, hollow structural sections, round bars, etc.):



UHMW (ultra-high molecular weight polyethylene plastic):

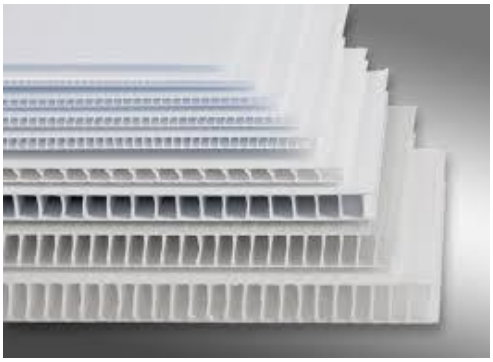
HDPE (high-density polyethylene plastic):



Vacuum formed trays:

XLPE (cross-linked polyethylene foam):

Corrugated plastic sheets (directional corrugated sheets):



Conpearl (non-directional polypropylene sheets):

CHAPTER 3: THE BEST METHODS TO LAUNCH A DESIGN

The preferred design software utilized for producing these amazing solutions is Solidworks. This software enables all users to accurately optimize the density for each package, no matter the shape or size. There are a few ways to initiate the design phase when acquiring data from the customer:

1. Obtain customer cad data (preferred method)

- When the customer successfully supplies the cad data (a 3d model for the manufactured component part) they want packaged, the design engineering team will then commence to load that part in the software (Solidworks).
- The package design will be built around the contour of the supplied part and with accordance to the requirements specified by the customer.

2. Receive dimensions of the manufactured component part

- Obtaining dimensions can also be an effective method to achieve an optimal package.
- The customer part can be designed with the dimensions provided and plugged into the overall assembly design to determine accurate results.

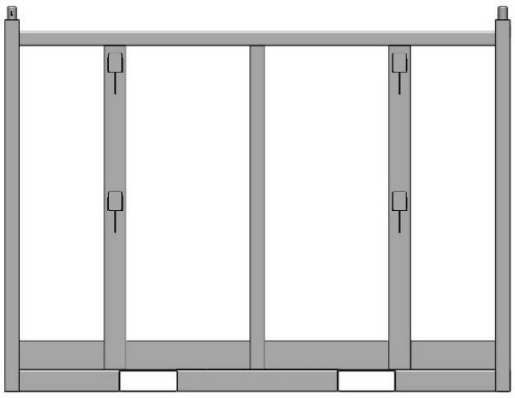
3. Collect an existing physical part for reverse engineering.

- If a physical part can be provided by the customer, then the supplier can measure the part and gather all the dimensions.
- Once all the dimensions are collected, the design can be built around the shape and size of the part to once again achieve accurate results.
- The bonus advantage to this method is that the part fit can be tested immediately by the supplier once the prototype of the package is manufactured to assure proper part fit.

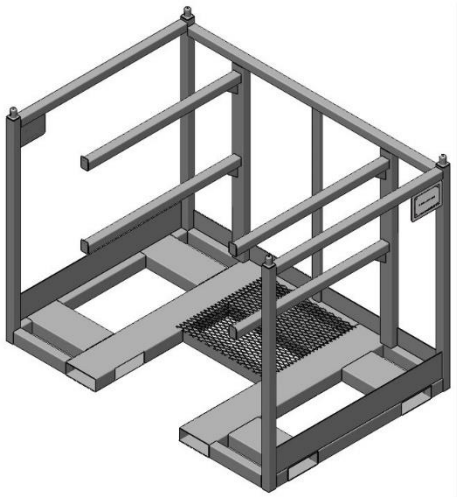
Here’s an example of the step one preferred method (design from obtaining customer cad data):

Receive CAD Data and requirements:

Produce a concept design to maximize density (in this case the part is orientated vertically along 2 rows resulting in the best and efficient overall quantity):

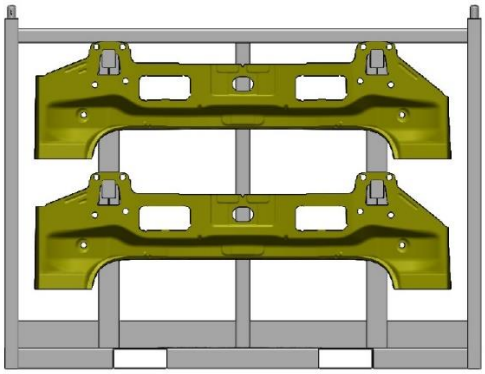


FRONT VIEW

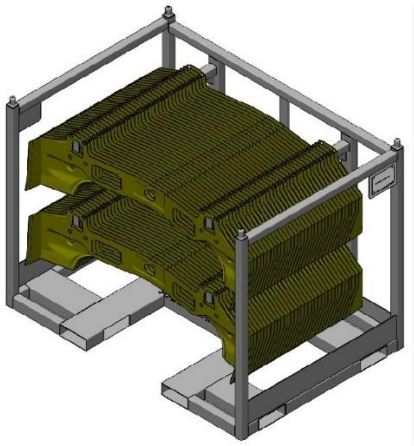


ISO VIEW

Input cad data into the rack design to determine the density and part fit:



FRONT VIEW



ISO VIEW

For this particular case, part contact is insignificant which results in close contact loading to maximize density. If the part contact was impermissible, then there would need to be a barrier between parts to separate them in the loading and unloading process, thus achieving less density.

As previously mentioned, the pockets in the base enable easy movement when the forklift forks enter the pockets and lifts this rack to transport wherever permissible.