What Is A Plastic Pallet. . .

Plastic pallets come in many shapes and sizes. It can be a 48” x 48” double deck, four way entry, heavy duty, stackable, reusable pallet that performs much like a hardwood pallet. Pallets are also clean, can be colored, are environmentally friendly (recyclable) and have infinite choices in shape, texture, controlled strength and cost. They can be double deck, single deck, any size up to say 60” x 60”, shaped to conform to a product, shaped to stack, provided with non-slip surfaces, etc. They can be made in one piece, two pieces or multiple piece designs that are welded, snapped or mechanically fastened together.

How Is It Made. . .

There are many methods of shaping plastics. Extrusion, thermoforming, blow molding and injection molding may be considered for plastic pallet production. The most common method is a variation of injection molding called Low Pressure Structural Foam Molding.
In this process, the plastic is melted by an extruder, a gas is introduced to the plastic melt and the mixture is forced into a mold cavity. Density reduction, ranging from approximately 10-20% or more, is achieved in the molded part. The plastic flows easily into the mold because of the presence of gas bubbles. The result is a low pressure injection molding process using low-pressure molding machinery and low cost aluminum molds. The product (pallet) has a high stiffness to weight ratio and has a rugged, durable appearance.

The structural foam injection process allows flexibility in shape and rib design. This provides for strength at low weight that is not achieved by other plastic processes. It is a clean, automated process, requiring a minimum amount of relatively low skill labor. One worker can monitor the machine and perform secondary operations when required.

What Are Plastic Pallets Made From. . .

Usually High Density Polyethylene (HDPE) of a low melt index for strength and stiffness. Recycled materials are used extensively and effectively. The Structural Foam Molding process is very forgiving when it comes to plastic materials. Fillers including recycled plastic, mineral and wood composite may be added to further reduce costs. Even commingled recycled materials are usable as a blend. Occasionally, demanding applications may require a glass filled
HDPE or an engineering resin. Metal stiffeners or other materials may also be inserted into the structure.

Density reduction of the plastic enables a thicker wall at the same weight. As wall thickness increases, rigidity increases exponentially. Density reduction is accomplished via an inert gas or a chemical blowing agent or a combination of both. The most common and cost effective method is nitrogen gas.

Pallets may be molded individually or in multiple cavities. In addition, multiple molds with different shapes and weights --- as well as family molds for complete assemblies --- can be molded in a single cycle. Because structural foam is a low pressure molding process, molds can typically be made from aluminum. These weigh less than steel, cost less, are easier to install and transport, and conduct heat more efficiently resulting in shorter cooling times. Machining aluminum requires considerably less time resulting in lower manufacturing costs.

Unlike conventional injection machines, structural foam machines are equipped with an external manifold system and multiple nozzles. Multiple nozzles reduce flow length, keep cavity pressures low plus molds do not require internal manifolds.

In addition to the structural foam process, a separate process known as gas-assist may also be employed to mold heavy or uneven
cross sections. Gas assist is a method of injecting gas directly into specific areas of the part to “core out” a section. This further reduces weight with the benefit of reduced clamp force requirements.

A distinct advantage of the structural foam process includes the ability to sequentially mold parts. Sequential molding means turning on and off individual nozzles to fill specific molds or specific areas of a mold over a given time.

Parts exceeding rated clamp force can be molded using sequential injection. Sequential injection offers many advantages including the ability to double the machine’s molding capacity. It is possible to mold parts requiring double the rated clamp force of the machine by shooting the parts in sequence and allowing a short dwell time between injection shots.

The Last Word:

Finding ways to complete in a highly dynamic global economy can be challenging. Companies that are thriving are using better, low cost processing methods. Low pressure injection molding is an economical way to manufacture many structural parts including plastic pallets.

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