

# *Retort Packaging Technology, its Market and Future Prospective*

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## **ABSTRACT**

The concept of convenience food has existed in the modern world since long that it makes it penetrates easily with the changing socio-economic patterns, lifestyle and eating habits. Although it made it place in the developed nations, the boom it has caused over the past decade in the Indian market is tremendous. Such goods are convenient for customers because both time and energy are saved. Hence, the process of subjecting the product to heat to minimize the microbial load has been in action since the use of these treatments in cans by US military for supplying food for the forces. It has taken a different dimension in the late years because of urbanization and the demand for ready to eat foods as grown rapidly. Though there has been changes in terms of the product range, packaging and different marketing tools, the fundamental concept of process has remained the same. Exposure of food in a hermitically sealed container to heat, to reduce the microbial population to achieve extended shelf life.

## **INTRODUCTION**

**R**etort pouch is composed of a flexible metal-plastic laminate that can withstand the thermal processing used for sterilization. It made up from heat-resistant laminated plastic, as well the retort pouches are semi-rigid, flexible packages. Food products like soups, pasta, rice, sauces, and cook-in-a-bag meals are sealed and sterilized

in these pouches with a maximum temperature of 121°C. Thus, they are the go-to packaging for convenience, processed and pre-packaged food. These pouches faced a stagnation period in the beginning due to the reluctance of the people to accept them. However, over the years manufacturers and companies have realized that using retort pouches for packaging reaps many benefits.

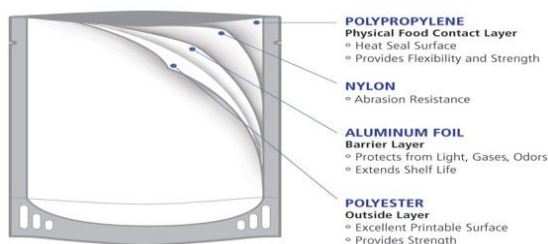
### Why Retort-Pouches are revolutionary?



The retort pouch is a flexible packaging structure that is hermetically heat-sealed to accommodate low-acid foods and to withstand thermal post-fill processing necessary to sterilize the contents in compliance with the 12 D low-acid canning process so that, when delivered at ambient temperature, the package contents will be free from any microbiological contamination. They are made from heat resistant plastics, unlike the normal flexible containers, making them ideal for retort processing at a temperature of about 121 ° C with good barrier properties (Mokwena and Tang, 2012).

### Retort layers and its importance

Specifically retort pouch consists of mainly four layers



<u>Polyester</u> (PET)	<ul style="list-style-type: none"> <li>Provides a gloss and rigid layer, may be printed inside</li> </ul>
<u>Nylon</u> (Bi-oriented polyamide) (Outer layer)	<ul style="list-style-type: none"> <li>Provides puncture resistance</li> <li>Printable &amp; protection layer</li> </ul>
<u>Aluminum</u> (Al) foil layer (Middle layer)	<ul style="list-style-type: none"> <li>Provides a very thin but effective main gas barrier to oxygen and water vapor.</li> </ul>
Food-grade cast <u>polypropylene</u> (CPP) (Inner/Food contact layer)	<ul style="list-style-type: none"> <li>Used as the sealing layer</li> <li>Heat stable layer</li> </ul>

<u>Polyethylene</u> (PE)	<ul style="list-style-type: none"> <li>Sometimes used instead of <u>PP</u> as a sealing and bonding layer</li> </ul>
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Source- (Pardos, 2004)

### Common structures of retort pouch:

Product Type	Structures	Features
Microwavable Pouches	High Barrier Pet/ Nylon/CPP Pet/ AluFoil/ CPP Pet/AluFoil/ PE Pet/AluFoil/ Nylon/ CPP Most commonly used is 12-	<ul style="list-style-type: none"> <li>Other forms are pillow (three-side-seal) &amp; Bottom gusseted stand-up formats provides shelf appeal</li> <li>Available with heat-free-handles</li> <li>Spouted or ear notch for easy dispensing and opening</li> </ul>
Pillow Pouches	12-micron AlOx PET/ 15-micron BON/ 70 microns CPP	<ul style="list-style-type: none"> <li>Sealed on three sides</li> <li>Tear notch for easy opening</li> </ul>
Spouted Retort Pouches		<ul style="list-style-type: none"> <li>Reclose able spouts offer convenience on the go</li> <li>Can be attached to any combination of stand up or pillow pouches in microwavable variants</li> <li>Spouts can be placed anywhere on the pouch, top or side</li> </ul>



- (a) Gusseted stand up pouch
- (b) Microwavable pouch
- (c) Aluminum/Transparent pillow pouch
- (d) Spout Pouc



### Retortable Trays

In general, the retort tray (or cup, bowl, container, bottle) consists of a moulded base with a wide opening and a flat flexible structure hermetically sealed to the base by heat (Driscoll and Rahman, 2007). Co-extrusions or laminations of water-vapor-barrier polypropylene plus oxygen-barrier ethylene vinyl alcohol have been the foundation materials in recent years. For dish-like trays and extrusion-blow-moulded barrier coextrusions for bottles and jars, the base materials are usually shallow thermoforms.



### Retortable tray

Retort pouches and trays and their relatives are lower-mass structures than containers of metal and glass. They take up a lower amount of space than cylinders and related types.

Products in flexible pouches/trays are often easier to reheat than the contents of cans. In recent years, the prices of container structures have fallen to far below those of metal cans and glass jars as more responsible converters have entered the market.

### The common structures used for the retort pouch

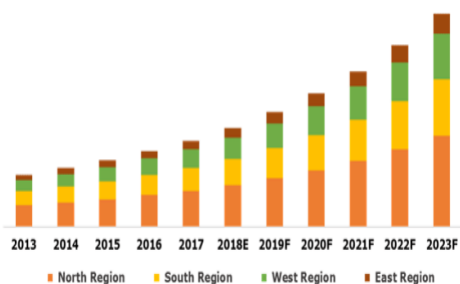
Food applications	Type	Materials	Properties
Gravies/Rice/ Vegetables & proteins	Tray	PP/EVOH/PP	<ul style="list-style-type: none"> <li>➤ Retort food package sterilizable at high pressure (over 120°C)</li> <li>➤ Reheat able in a microwave oven</li> <li>➤ Long ambient shelf stability with oxygen barrier and excellent hygienic function</li> <li>➤ Easy peel lid</li> </ul>
	Lid	PET/EVOH/O PA/ CPP/OPA/ PP	
	Bowl	PS/EVOH/PS	

### Market of retort pouches

The demand for retort packaging was estimated at USD 41.65 billion in 2020 and a CAGR of 7.11 percent over the forecast period is projected to occur (2021-2026). A traditional means of preserving food has been the thermal sterilization of low-acid food products and is the basis of the evolution of retort packaging. The versatility and adaptability of the retort packaging technology has resulted in rapid market development (Barbosa et al., 2014)

- Recent advances in retort packaging have stressed the reduction of the total material weight, without losing the consistency of the packaging. The focus on weight reduction of the materials had been widely appreciated.
- To achieve a competitive advantage in the market, consumer goods companies are increasingly relying on packaging solutions. Consumers are demanding and

quick to use goods that have extended shelf life, which in turn pushes businesses to find alternative packaging solutions.



Benefits of retort pouch with cans

<b>Cost Savings</b>	Contents do not have to be blanched or pre-cooked prior which reduces manufacturing and processing time
<b>Material Handling</b>	Reduced packaged weight and dimensions eliminates heavy, bulky cans/jars during handling / waste easy to handle, ship, store, use and dispose of.
<b>Convenient</b>	Consumers find pouches easy to handle, store, and dispose off
<b>Safety</b>	Heating liquids in cans can produce dangerous pressure, and opening cans leave raw edges that are sharp
<b>Better branding</b>	Consumer visibility with larger branding and surface area
<b>Quality</b>	Foods cook safely and evenly, and since overcooking or uneven cooking of canned foods can be avoided hence the quality level is high.
<b>Design Options</b>	It comes in multiple sizes and configurations shapes, printable surfaces.

### Key Market Trends

For most nations, reducing the waste of food has become a major concern. According to the UN Food and Agriculture Organization, almost one third of the food produced for human consumption is projected to be wasted globally or about 1.3 billion tons annually. Many products such as meat, dairy, bakery and daily meal (food) items are having a shelf life maximum of one month. This contributes for the wastage loss which leads for the financial losses. To resolve this emerging problem, manufacturers are focusing upon shelf stable options i.e., Retort products. Because of various benefits (retort), such as high shelf life comparable to metal containers, corrosion resistance, adjustable size, etc. Retort pouches are one of the most commonly used packaging methods compared to the other available alternatives in worldwide.

### Future trends

- Over the last 10 years, there has been a significant change in the profile of retort users. Previously an exclusive ambient foods club, retort ownership has diversified to such an extent that many of today’s major installations are on chilled pasteurized products, such as ready meals, soups and vegetables, or in component processing for use in the production of other foods, such as rice and protein cooking prior to inclusion in recipe dishes. Additionally, the food service sector has been looking at methods of extending life and making the distribution chain more efficient.
- Cheaper cuts of meat, such as shin beef or brisket, can be tenderized within the retort at low temperatures, and cooling systems mean the product can be discharged at chill temperatures across a high risk/low risk separation regime without additional handling. Because there is no down time for cleaning between processes, a retort is very flexible when it comes to handling

the wide range of products found in chilled food manufacture.

- Another recent application has been the pre-cooking of ham shanks and belly pork joints. The product, once cooked and cooled in a bag, is then dispatched to stores with hot food counters, then finished off in roasting cabinets.
- Seafood processors are able to use retorts for gentle controlled defrosting; the product is then prepared and finally cooked or pasteurized in the retort prior to dispatch.
- With the continuing consumer drive towards more convenience, vegetable growers are now reaping additional margin by processing vegetables to a ready-to-eat state in pouch and tray. Chipped, boiled, mashed and even jacket potatoes, part cooked, are flooding the chilled foods market and they require only reheating in a microwave.
- With steam/air retorts it is also possible to steam ‘unpacked’ product, loose in stainless retort trays, such as cauliflower, broccoli, mange-tout and leaf products including spinach. But the aim is not to increase shelf-life, but to give minimal cook and then use cryogenic gas cooling to maintain color without damaging the structure of the delicate product. Whilst more expensive than traditional cooking methods, structure, color and nutrient loss are minimal

## CONCLUSION:

The increasing public awareness and aversion to accept other methods of food preservation like chemical preservation, irradiation, etc. have offered a vast scope for retort processing of foods. The emerging technology in the food packaging industry resulted from the increasing demand among consumers. Convenience is the major driver in the food industry today. As this is unlikely to change, more and more delicate packs will emerge, to tempt consumers to associate thermally preserved foods with fresh chilled foods.

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