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“Over the years, the production volume of rPET has significantly surged at a noteworthy CAGR of 15.5% during the period FY 2009 - FY 2014, without exhibiting any signs of slowdown. With newer applications emerging, it is expected to grow exponentially,” says Sunil Jain in dialogue with POLYMERS Communiqué.

## India's rPET Market Likely to Reach INR 205 Billion by FY 2019

### **Q. In India, where have we reached as regards the rPET usage?**

What we are witnessing today is the tip of the iceberg. Textiles and carpets are not the only avenues for rPET. Packaging will contribute substantially as a major end use of rPET. We still have a long way to go in terms of applications. It gets further impetus from the fact that collection of used PET bottles by various developed cities in the country have set into place various collection schemes assisted by a roaring business employing armies of rag-packers.

### **Q. What holds back its wider acceptance?**

rPET sheet is an extremely sensitive product, both

in terms of technology employed and in terms of quality of inputs used. PET sheets produced from virgin polymers are not cost effective. PET straps have been the third largest market of rPET industry in terms of revenues and second largest market in terms of production volume. There does exist a gap in terms of collection techniques, appropriate segregation of consumer waste, washing techniques and producing an acceptable quality of rPET flakes for sheet extrusion. Nevertheless, fortunately the situation is rapidly changing. Investments have taken place to tackle all these constraints. The technology to produce good quality sheet does exist in the country. At Rajoo, we offer an excellent solution.

### Q. What could be the impact of hyper competition in PET prices on the rPET market?

There should not be a substantial impact. rPET flakes, equivalent to the virgin material in terms of quality, are available at 60% of the original cost. With organised collection systems now being introduced in many cities, and with the used PET bottles directly going to the recycling industry, the prices are expected to drop. This would certainly not influence the prices of virgin PET.

### Q. What about the wear and tear of rPET when compared to PET?

There is really no difference, if the quality of rPET flakes meet the specified norms of contamination and impurities. With the use of appropriate crystalliser and dehumidifier, there is not much IV drop, resulting in hardly any difference in processing rPET as compared to virgin PET.

### Q. What according to you is the next basket of rPET applications that the industry should focus on?

rPET has many advantages as compared to other competing materials. To enumerate some of them - crystal like clarity, toughness, light weight, good gas barrier, good solvent resistance, good corrosion resistance, long lasting dead fold properties and, of course, being regrindable and recyclable. While there are some non-packaging applications, following packaging related applications have a good potential:

- Potable water and cold drink glasses (including deep drawn)
- Milk packaging
- Take away food containers - for sandwiches, salads, bakery products etc.
- Pharmaceutical blister packaging - for tablets and capsules
- Industrial and general packaging - for dry battery cells, tooth brushes, kitchen accessories, ball bearing, automotive components, industrial parts etc.

### Q. Do you see sheets and films

### overtaking the fibre demand for rPET?

Fibre used in textiles is a mass consumption product and will always be ahead as compared to sheets and films in terms of volumes.

### Q. Have technology providers played the role of an enabler to help grow this sector? In this regard, how do you see the next 5 years?

There had been a gap in terms of right quality of rPET flakes and the ability to process them to produce high quality sheet - both these constraints stand overcome. Several solutions are now being offered world-over and in India as well by local machinery manufacturers for producing rPET sheet. There is a divergence in opinion - twin screw or single screw, with crystalliser or without crystalliser, with dehumidifier or without dehumidifier, vertical stack rollers or inclined / horizontal.

In terms of the extrusion process, analysis has concluded that single-screw extrusion is much safer, more efficient, gentler process, creating better quality with less capital investment. Twin-screw direct extrusion process is not that energy-saving as claimed. It does not provide a long enough dwell time for the materials inside the extruder. Twin-screw direct extrusion process has limited dehumidification performance. It can only accept limited variety of materials at low moisture content. The IV drop is virtually higher than 8 to 10 points. Single screw has only a very small IV drop. Extended speed crystallisation / dehumidification gives dryness grades of around 50 ppm, it does not matter what the initial moisture content is. High dryness results in very clear sheet, free of speckles, die-lines, smooth and ductile. There is no limitation to admitted initial moisture. High flexibility, variety and range of materials can be processed. Even with a high content of factory skeleton waste, the process stays constant. At Rajoo, we do offer this advanced technology with several operating projects in Germany, Spain, Mexico, Columbia, Ecuador, Russia and, of course, India.

### Q. Any requirements from the regulatory side that would help this growth?

The concern for rPET has escalated in the recent years. PET bottles, which form the major market of PET packaging resin (94%), are most important from the point of recycling. Over 90% of PET is consumed in food packaging with drinks / beverages forming almost 80% of the food-packaging segment. Since drinks and beverages are consumed mostly in residential houses, railway stations, restaurants, entertainment venues, airports and other public places, the importance of organised collection and recycling of post-consumer PET bottles needs to be over emphasised.

Contaminant migration at increased temperature applications is an issue of apprehension. While some regulations do exist, but are not very scientific. However, a study was prompted by a report that questioned the efficacy of an ABA structure with PET recycle behind a functional barrier and suggested that the virgin cap layer may become contaminated during extrusion, rendering the functional barrier inadequate. An independent study was conducted and then reaffirmed by FDA guidelines for the use of virgin PET cap layers as functional barriers over post-consumer recycled PET flake materials for direct food packaging use. It was concluded that a 25 microns thick virgin cap layer meets the necessary functional barrier requirements for room temperature applications and 50 microns thick for high temperature use upto 150°C to prevent permeation of contaminants migrating from post-consumer PET regrind core layer.

### Q. Any market estimations by 2020?

India's rPET market is likely to reach INR 205 billion by FY 2019. Over the years, the production volume of rPET has significantly surged at a noteworthy CAGR of 15.5% during the period FY 2009 - FY 2014, without exhibiting any signs of slowdown. With newer applications emerging, it is expected to grow exponentially.