

# European and US recycling reports

*Two sides of the Atlantic*

According to figures from Petcore (PET containers recycling Europe) European post-consumer PET collection rates reached 944,000 tonnes in 2006, an 18.5% increase over the previous year. The growth in PET collection continues, by far, to exceed the growth in consumption with 38.6% of all used PET bottles being collected for recycling. Collection continued to grow steadily in most European countries, with the highest increases seen in countries where national legislation is changing to allow single trip bottles to replace refillable containers. The recorded collection has increased markedly in the UK and Ireland, because the PET component of mixed plastic bales has been counted for the first time.



"I am delighted with the continued increase in PET collection throughout Europe and our high recycling rate. 21 of the countries surveyed now have a higher PET recovery rate than the 2008 target of 22.5% for plastic recovery set by the European Packaging Waste Directive." said Roberto Bertaggia, Chairman of the Petcore Board.

With a total maximum input capacity of more than one million tonnes spread over more than 80 companies, Europe has the capacity to recycle all of the PET bottles collected.

In 2006 export of collected PET to the Far East was down to 14%.

The largest percentage of the post-consumer PET containers was

The PET recycling business continues to exhibit healthy growth rates, despite a fall-off in the percentage of post-consumer PET recycled within the USA.

recycled into polyester fibres. The market for polyester sheet rapidly gained share in a range of thermoformed applications where the use of recycled PET increased by 60% over 2005. Bottle-to-bottle has also steadily increased.

## USA less enthusiastic

The 2006 report by Napcor (the National Association for PET Container Resources) indicates that in North America 2006 was a better year for the PET recycling industry than many forecasts had predicted at the beginning of the year. Fears of virgin PET oversupply and the accompanying price deterioration proved unfounded. Post consumer bottle collections were up and prices for bales and dirty flake provided a strong revenue stream. While the increased supply was mostly exported, US reclaimers were still able to secure an adequate supply at competitive prices.

Certain key events in the USA in 2006 do however merit discussion.

**1)** The "WalMart effect". During the fourth quarter of 2005, WalMart announced to their suppliers and customers that they would be evaluating the environmental impacts of all parts of their operations, including the packaging of the products they sell. This evaluation should put PET containers in a very favourable position to gain additional market share. In addition the attention that Wal\*Mart has brought to the issues of climate change and sustainability has rippled throughout the business community and will surely have a positive impact on the demand for recycled PET.

**2)** Wellman closed its Johnsonville, SC, PET recycling plant during the fourth quarter of 2006. This is the only example of a recycling company that, in the mid-nineties, con-

verted itself to a virgin resin producer. Whatever the reasons for closing the plant, the closure sent a strong negative market signal with respect to the viability of PET bottle recycling.

**3)** WMI closed Chicago PRF and put Raleigh up for sale. Waste Management's "Recycle America" subsidiary built two plastic recovery facilities, one in Chicago and one in Raleigh, to sort and granulate bales of mixed bottles. The investment, in excess of \$20 million, was aimed at eliminating labour and replacing it with centralised automatic sorting technology but by the end of 2006, WMI had announced the closing of the Chicago facility and Raleigh was up for sale. The problem, which is faced by most sorting/recycling facilities, appears to be the quality of the mixed bales. This event above is mentioned to highlight a growing debate. As more and more pressure is applied by environmental groups, public policy makers, and consumers to recycle all plastic packaging, the question that emerges is "How?" All reclaimers interviewed voiced bale quality as their number one concern.

Napcor determined that, based on the total usage of virgin and recycled PET resin, the total amount of post-consumer PET available for collection in 2006 was 5.424 billion pounds (about 2.5 million tonnes). In fact some 1.27 billion pounds (0.58 million tonnes or 23%) were collected. Over 50 percent of this was exported as PET or mixed bales. In fact 2006 marked the first year in which more of the PET bottles collected for recycling went to export markets than stayed in the US. Hopefully, the reawakening of environmental concerns will be the catalyst necessary to stimulate some world-class investment in the US.

# 2008 - PET takes to the hills

Mountainsmith, the American specialist manufacturer of rucksacks and other types of outdoor carriers, has something new in store for 2008 - over 30 items where they use recycled PET to produce the textile element.

Recycled PET is often used to produce fibres, and it is a pleasure to report on a high profile fibre application such as high-end branded products such as those from Mountainsmith. A good example of the product range, and Mountainsmith's "green" philosophy, is the "Needle" rucksack designed for mountain walking and trekking. The whole of the base fabric, the webbing and carrying straps are all made from 100 percent recycled PET. The rucksack is fully water-

proof, and it performs well against the competition: the Needle's pleasant, "breathing" back support, low weight (just 1.2 kg) and 36 litre capacity are just what is needed for outdoor sports. Skis, a snowboard or ice picks and crampons can easily be attached.

## 1.1 million PET bottles

For the 35 items in their 2008 summer collection that Mountainsmith are producing from PET they will

need 1.1 million empty 0.5 litre PET bottles. These will be picked up by the recycling organisations from post-consumer PET collection points and sorted by hand, with the help of the PET identification mark. The production of textile fibres for trendy "eco" products involves 5 separate steps - PET collection and washing, grinding, melting, spinning and weaving. It is also calculated that using recycled PET saves about 60% of the energy that would be used if virgin polymer were used.



## PET-M

*A method for upgrading RPET to a food contact approved PET*

In the PET-M and the PET-M process technology, developed and patented by the PTP Group, a modifying agent is used to restore the original properties of the PET molecules. For optimum processing the Crystal Cut Technology, developed by BKG, is used.

The PTP Group began operations in 2002 and now has several subsidiaries and affiliated companies in Europe and North America. As well as producing and promoting PET-M the group, which employs about 100 people, manufactures some 250 million preforms per annum.

The main characteristic of the PET-M process is the addition of a mixture of modifiers. During the process these modifiers are mixed with PET flakes, heated and dispersed over the surface, where the reaction is initiated. The coated flakes are then transferred to the extruder where a full reaction in

the PET melt phase takes place. The resulting product is PET-M, a PET polymer with molecular chains inter-linked by silicon bridges to restore the PET molecules.

### PET-M characteristics:

- Slightly different molecular structure from PET
- Similar properties to virgin PET (in some tests even better)
- As stable as virgin PET at the melt temperature
- Good processing performance for all applications
- Fully recyclable and compatible in PET recycling streams

### Testing and evaluation

Numerous tests by independent laboratories have demonstrated that PET-M is a reliable product which can be used in the production of food safe bottles and thermoforming film. Some of the tests carried out include:

- Challenge test and migration tests in line with FDA and EFSA procedures

- Process evaluation and approval by the Czech health authorities for the use of PET-M in the production of beverage packaging
- Certification of production facilities by PET-Cycle
- Multiple recycling test by PFE (Plastic Forming Enterprises)
- FCN, "Notification for a new use of a food contact substance" by the FDA.

The PTP Group has worked closely with companies producing preforms and thermoforming film to test PET-M. In these tests it was shown that PET-M can be used up to 100 % in their standard production processes.

### Economics

The production costs of PET-M are competitive with other processes for upgrading PET flakes. The process will be economically attractive in recycling operations with an output of 5,000 tons/year (in a 3 shift operation) or more. Capital costs for production equipment are significantly lower than those of competing technologies.