Metal, plastic or glass?

An update on smallpack choices

Three years on from writing an article about Ball Packaging Europe on how cans were made, I am now looking at glass and ‘plastic’ as well. Cans were being promoted as a modern and environmentally friendly packaging material for beer. At that time premium packaged beer was being promoted in glass – the image of a glass bottle was seen as upmarket.

by Paul Buttrick
Beer Dimensions

Around the world, governments had differing policies and attitudes. For example, can sales in Germany were decimated due to the government’s introduction of a deposit system. The major retailers removed cans from their shelves and concentrated only on PET. However, changes to the legislation making reclaiming a deposit easier has resulted in the very recent listing of canned beer with the Penny and Netto retail chains. The original legislation was meant to protect the refillable bottle market, but a proliferation of unique style bottles (over 800) has resulted in difficult logistical and sorting problems and canned beer sales are expected to grow again from a very low base. In 2010, there is much media coverage of environmental issues, so, how is it effecting the small packaged beer market? I found it hard to get hold of what I call ‘joined up’ information. There are so many interested bodies – manufacturers and their associations, brewing companies and their marketing departments.

General situation worldwide
All manufacturers of small packaging materials are reporting growth because more beer is being drunk at home, for example in the UK, take-home sales increased by 14.4% between 2005 and 2009. The proportion of packaged beer sold in the on-trade has not increased, draught sales have remained at 92.5% over the same period.

Packaging figures for the UK from the British Beer and Pubs Association shows that of 24 million hectolitres of beer packaged, 66% was in cans, 33.5% in one way bottles, 0.24% in PET and 0.06% in returnable bottles.

In Europe trends in packaging for take home beer varies greatly between countries. Germany (90%) and Central Europe (65%) remain loyal to returnable bottles. Sweden (80%) and the UK (69%) have the highest proportion in cans which are also increasing in the Benelux.

One way bottles are highest in the France (65%) and Spain/Portugal (32%) and the UK (29%). Although glass bottles remain dominant in Western Europe, can sales are growing as a percentage of the market for example in Poland and Benelux. In Asia and South America, glass continues to dominate, but cans are beginning to grow from a small base. In the other major beer market, the US, cans dominate glass by about 60:40. Beer in PET remains very small in all markets except the CIS, with a 46% share. Figure 1

PET remains the dominant packaging material for carbonated soft drinks across Europe with 50-80%, followed by cans at 10-30% and glass generally under 10%. PET is dominant, because, apart from loss of carbonation, quality is largely unaffected, the package is light and is easily and cheaply produced, although cans are beginning to make headway in some markets. Environmental issues are moving higher on most country’s political agendas, with companies striving to reduce energy, material usage and overall costs. More forward looking companies will be able to show shareholders and consumers that they care for the environment, less proactive organisations will falter in the longer term as the more enlightened reduce costs and improve their image. I am not sure how much consumers are wedded to ‘saving the planet’ when they go shopping, although I’m sure in questionnaires in their own living room they show more concern.
The metal can situation

Europe wide, fillings of cans were 33 billion in 2008 as consumers took home beer rather than going out (up 6.7% on the previous year). My article in 2007 reported that that can manufacturers were getting their act together in promoting the environmental advantages of the metal can. Its image as a throw away package was poor, but recycling and moving its image from a commodity to a more premium option was beginning to take place. Makers now present cans as an environmentally friendly package choice for take home beer.

The benefits of metal cans for beverages emphasised by manufacturers are:

• Cans are good for beer quality, it is a sealed, dark pressurised container, with no gas or light ingress and CO2 cannot get out.
• Cans have comparatively low distribution costs and, because of their shape they are efficiently stored and transported. A fully loaded trailer of canned beverage contains approximately twice as much liquid volume as one carrying bottles. Transport is the third highest factor in the supply chain after filling and retail costs, therefore, the further afield beer is distributed, the more transport saving benefit is realised.
• Cans cannot break – they can dent though!
• According to a survey for the main can manufacturers’ consumers, 62% prefer chilled drinks from a can compared to glass or PET.

Lightweighting

Can manufacture has made very significant progress in reducing waste in energy and materials and lightweighting of cans. In 2010 a 500 ml aluminium can and end weighs approx 16g, a steel can approx 30g, this is 50% less than 30 years ago and compares with 80g for the first cans 60 years ago.

Recycling

Both steel and aluminium cans are 95% recyclable which uses only about 5% of the energy and hence CO2 emissions compared to producing a new can. Average beverage can recycling rates in Europe for aluminium cans released by the European Aluminium Association (EAA) in May this year were 63%, 51% in the UK, with Germany recycling at 98%. Belgium, Sweden and Switzerland all recycle over 90%. Recycling rates for steel cans are similar, with APEAL (Association of European Steel for Packaging) reporting recycle rates for steel packaging material in Europe at 69%. Again Germany and Belgium were the lead recyclers with over 90%.

The major can manufacturers in Europe and the UK are Ball Packaging Europe, Rexam and Crown Bevcan Europe & Middle East. As well as making huge strides in reducing material and energy usage, all of them have made a big effort to make cans more appealing to consumers. Manufacturers started to develop more attractive upmarket cans with different shaped and embossed cans in order to connect with modern consumers. Ball Packaging Europe has identified five main trends, with consumers buying an experience as opposed to a simple package. They have set their development team working on functional and emotional innovations to appeal to modern consumers. An example of functional innovation is the 'recloseable' can.

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showing matt finish on German beer in the consortium bottle’ - (The lightweight bottle is on the right).

Growing number of smaller breweries getting into the take home market.

Very few sell beer in cans, but use the bottle as a flexible and easy way of marketing their beer with well designed labels and innovative packaging.

Lightweighting

The glass industry in the UK includes global glass makers Ardagh and O-I (Owens-Illinois) as well as Beatson Clark the largest UK-owned beer bottle manufacturer. Irish-owned Quinn Glass employs over 600 people at its modern and unique glass manufacturing, filling lines and automated bonded warehouse near Ellesmere Port. Glass suppliers such as A.E. Chapman & Sons, Rawlings & Son (Bristol) and Croxsons, are able to offer glass to smaller brewers who cannot take the huge volumes made by the larger producers. In 2007/8, as part of the GlassRite project (see WRAP below), Ardagh Glass introduced a 500 ml light-weighted 298g design with a ‘consortium bottle’ filled at Robinsons Stockport for a number of smaller breweries.(Figure 7).

In a similar manner, A E Chapman have worked with O-I on providing lightweight bottles to smaller brewing companies, and in June this year, increased their range of ‘light-weighted’ 500 ml bottles, by announcing a new 330 g bottle to augment the two 300g bottles already available. This bottle is 17.5% lighter than its 400g competitor. In this respect, bottles have a distinct advantage over cans in that bottle shape and design can be shared by smaller companies, but printed cans must rely on longer, ‘bespoke’ production runs.

Recycling

Alongside reductions in package weight and more efficient manufacturing, glass can be infinitely recycled. According to British Glass, during 2007, Europe recycled over 11 million tonnes of container glass, the equivalent of taking 1.7 million cars off the road. The glass recycling rate in Europe is 61%, with Germany recycling 87% and Switzerland 96%. Of the other big users, the UK recycles 54% and France 61%. Working with WRAP and aligned to ISO 14021, the UK glass industry is now able to provide verifiable recycled content for all three colours.

The main issue with glass recycling is the lack of good quality colour separated material and a move to large-scale mixed colour collections has resulted in an increase in down-grading of remelt to aggregate instead of recycling into new bottles. There is a lot more recycling potential in the UK with green glass recycled from wine bottles, maybe the brewers using green bottles are right all along!

WRAP (Waste and Resources Action Programme)

WRAP is a UK Government-funded organisation. It works with the public and private sectors, as well as individuals, with the vision of ‘a world without waste where resources are used sustainably’. Part of its function is to operate as a catalyst for positive environmental change. One sector where great success has been achieved is in glass packaging for the drinks sector. It worked with Glass Technology Services, the glass manufacturers, the brewing companies and retailers to reduce the environmental impact of packaged beer.

Two initiatives, Container Lite (2006) followed by GlassRite (2008) were instrumental in reducing the weight of glass bottles by 20–30%. Notable successes were achieved by O-I in lightweighting Adnams’ 500 ml ale bottle by 34% to 299g. Molson Coors UK, working with O-I and Ardagh Glass won recognition for reducing the weight of its Grolsch and Coors Light Fine Lite one-way bottles by 23% in the original Container Lite project (Figure 8). By the time GlassRite was complete, over 60 beer and cider brands had moved on to lighter bottles in conjunction with the main glass manufacturers.

Another WRAP initiative that touches on the beer industry in relation to supermarkets is the Courtauld Commitment, which is a voluntary agreement for those in the UK retail supply chain to reduce packaging and product waste from supplier to households. The first agreement in 2005 had targets solely associated with reducing waste measured by weight. However, the second phase of the Commitment, launched in March this year, widened the scope to ‘achieve a sustainable use of materials over the entire lifecycle of a product across the whole supply chain’, with the packaging target moving away from weight towards carbon. Significant signatories to the latest agreement are Heineken UK, Molson Coors and Constellation Europe.

Marketing opportunities and a company’s environmental credentials

With the effort and investment put in, and success had by companies improving their environmental performance – and presumably their reducing costs as well, it has taken them a long time to demonstrate ‘green’ credentials to their consumers. There is plenty of information on the internet by package manufacturers, their trade organisations, but very little is passed on to the consumer.

Beer advertising has gone through many phases – talking dray horses, policeman’s refreshed feet, well know comedians, followed by style and chic and even reassuring expensive, but not one has said anything about ‘green issues’ – apart maybe a reference to 100% natural ingredients. Two very different companies which have changed this approach are Adnams and AB-Inbev. Adnams as a company are following a ‘low carbon philosophy’, and have enhanced their reputation with their grass-roofed warehouse and energy-efficient new brewhouse. They were also one of the first to look at lightweighting their bottles and even brewed the first ‘environmentally responsible beer’, East Green. (Figure 9)

AB-Inbev has started a new trend in
trumpeting the ‘green credentials’ of its Stella Artois brand and unless it fails as a campaign, will probably be the first of many. Stella Artois ‘eco marketing’ – started with a number of successful initiatives last year: the Hedge Fund campaign, where consumers who bought a pack of beer were indirectly contributing to the UK Tree Council’s projects (Figure 10). Another campaign focused on the 100% compostability of Stella Artois multipacks (Figure 11). An initiative using the internet’s You Tube entitled ‘Le Recyclage de luxe’ shows stylish clips demonstrating the ‘eco’ credentials of the iconic brand with a distinct European 1960s flavour. If you have a few moments, it is quite a catchy tune!

PET beer bottles
PET beer bottles have been around for a long time, but problems of gas permeation across the PET meant that the beer lost carbonation and became oxidised. Solutions were found with the introduction of multi-layer bottles and barrier coatings in the 1990s. In more recent developments, Amcor developed Bind-Ox, an active oxygen scavenging material which prevents oxidation of the beer. Other PET suppliers have used oxygen scavengers combined with a nylon based material.

When small PET bottles came on the scene, they were aimed at the sports and concert arenas, whilst this is still the case, penetration into the mainstream market has been limited. Problems on beer quality was the main issue, but recent developments have increased beer shelf life to between 6 and 15 months. The cost of manufacture is currently the main obstacle, with only Carlsberg – Holsten in Germany, investing in high-volume cost-effective packaging lines. This investment was driven by the 2003 German Packaging law which required a deposit levied on drinks in single use containers and PET now accounts for approximately 6% of volume. Germany is also unusual in that 41% of soft drinks are filled into re-fillable PET, slightly more than one-way PET at 37%.

There is only one remaining beer PET bottling facility left in the UK at Aston Manor in the Midlands. The company was founded in 1983 and is still in the private ownership of the Ellis family (Doug Ellis of Aston Villa FC fame). The company is the UK’s third largest cider maker and last year bought the Tiverton-based Devon Cider Company from the administrators. Aston Manor last year filled 14 million 330 ml and 500 ml bottles of beer on a 24,000 bottle/hr filling line supplied by Krones. The Crown Cork, oxygen impermeable multi-layer bottles are from Constar and come in already formed. Other companies no longer filling PET bottles made their own bottles on site from PET ‘preforms’. Contract packaging is carried out for all major brewing and cider companies in PET and glass.

One trip vs returnable packaging
This debate brings no definitive answer, and retailers and producers have to take a view as what is best in different markets. In areas where production sites have been rationalised and spread throughout large areas, there are significant advantages with less robust ‘one trip’ packaging. Where packaging sites are localised and recycling facilities capture most containers in a closed loop, a refilling process can be more efficient. This is the case in Bavaria where over 900 small breweries serve small local areas. In the UK where large production sites serve regional and national areas, there are environmental and financial benefits from one-trip packages. A major issue with refillable containers is the logistics of sorting and returning empty containers for refill. A study carried out for WRAP in 2008 considered ‘Refillable glass container systems in the UK’ and gave a very good review of these discussions and whether the UK could revert to a refillable package scenario.

Which material is best for the environment?
Three reports have come to three different outcomes. To show how complex the environmental debate is, here are extracts from three studies carried out by three independent professional organisations.

1) ‘A new lifecycle assessment reveals that beverage cans are environmentally competitive with returnable bottles’. Results of this study commissioned by the BCME (Beer Can Manufacturers of Europe) by the IFEU –Institute of Energy and Environmental Research, was published in Dusseldorf in May 2010. The research found that on a full lifecycle assessment, the can is now on par with returnable bottles, due to large cuts in material usage (a 25% reduction in the last 15 years), recycling rates and changes in consumer habits. Cans are best when national distribution is taken into account. A more efficient use of weight and volume on transport is the main reason.

2) ‘A PET bottle is the most environmentally friendly format for beer brewed and bottled in Belgium and disposed of in the UK’.
This research was commissioned by packaging group Sidel and conducted by the research firm RDC-Environment. Comparing 500ml PET, glass long neck
3) ‘Owens-Illinois recently carried out a Life Cycle Assessment of its glass containers on a world-wide basis’.

It demonstrated the credentials of glass containers when compared to PET and aluminium packages. The assessment is said to represent the packaging industry’s first complete carbon assessment. The report points out the difficulty in comparative environmental assessments; what is included and what is excluded can make a complete difference to the final – may I even say ‘desired’ outcome. A conclusion was that the reduction in carbon emissions by using recycled glass more than offsets those of the transportation of finished glass which contributes only 4-5% of glass’s complete carbon footprint.

A table showing carbon dioxide emissions for PET, glass and aluminium cans for North America, Latin America, Western Europe and Asia-Pacific, show glass to have the smallest footprint in all four areas. Aluminium cans have the highest footprint in North America and in Asia, but is comparable in Europe and Latin America.

**In conclusion**

Taking everything into consideration, there is no particular package that can be said to be ideal. This is shown by the differences between countries in Europe. In localised distribution, refillable packs are sustainable and viable, but as the market gets more complex, and the further a product is transported, then a one-trip package is a better option. As to whether glass is better than plastic or aluminium or steel, or any other combination, then customers will decide on mood, image, price and maybe a growing concern for the environment. Manufacturers will continue to innovate and produce more exciting packages whilst at the same time reducing material use, waste and energy usage.

Great strides have been made by the drinks industry and many improvements have been made in a joint efforts of the retailers, the drinks producers and glass manufacturers, facilitated by organisations such as WRAP. I don’t think the consumer has heard enough about how proactive the industry has been, perhaps it should blow its own trumpet – or should I say vuvuzela, more.

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