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Communication Supplies Consulting Service Europe

December 17, 2004

Western European Inkjet Aftermarket Overview: 2003-2008

Table of Contents

Introduction	2
Market Size and Overview	3
The Inkjet Cartridge Aftermarket Segmented	5
Penetration of the Aftermarket by Country.....	12
Types of Inkjet Refills	13
Syringe/Refill Kit	13
Compatible Inkjet Cartridges	14
Clicks.....	14
Ink Station	14
Service	14
Key Issues.....	15
Collection of Empties and Environmental Issues.....	15
Waste Issues and Empty Cartridges	15
Update on the WEEE Scrap Waste Scheme.....	16
Eco-Design of Energy-Using Products	16
Smart Chips.....	17
Conclusion.....	17

Introduction

This report provides an overview of the inkjet printer cartridge market and aftermarket. It is an update of the White Paper that was published in May 2003, and draws upon forecast information taken from the latest inkjet printer supplies forecast for 2003-2008. The report examines the inkjet cartridge market and more specifically the inkjet cartridge aftermarket. It discusses how this market is broken down according to various segments such as original and aftermarket cartridges as well as integrated and non-integrated cartridge types. It also looks at some of the key issues in the market such as collecting empties, the presence of chips, the increasingly important role that environmental legislation is playing, and the growth of the refilling retail chains in the industry.

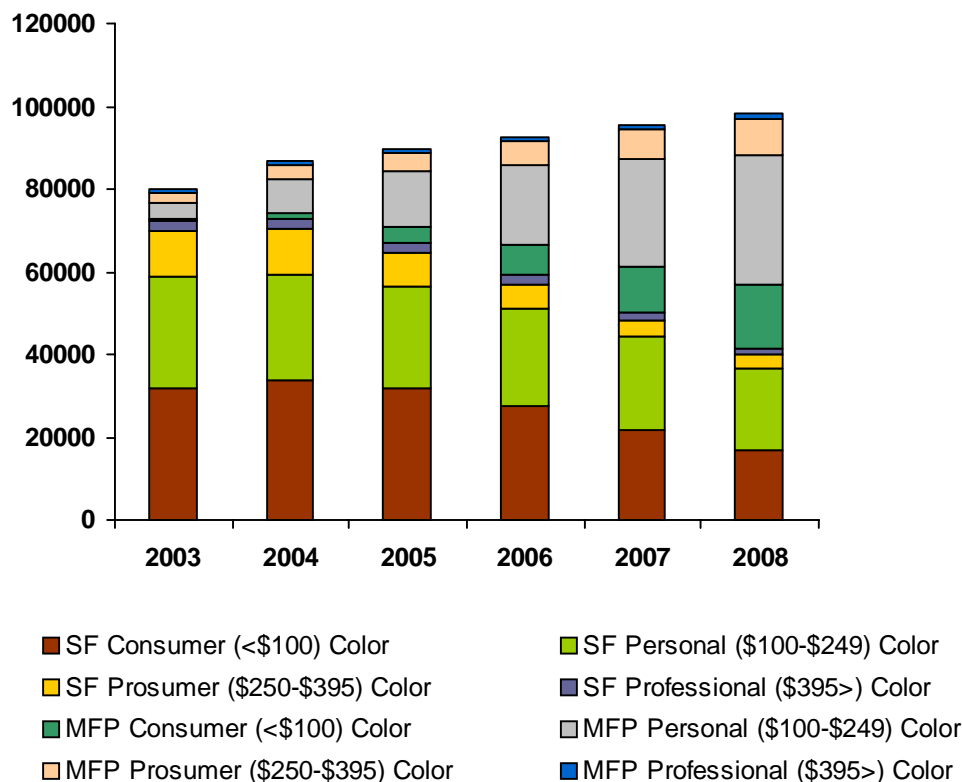
The inkjet aftermarket includes those ink products that are not OEM-branded consumables that are sold for printers with the same OEM brand. Aftermarket ink products can take several different forms, including compatible tanks for use in printers that have a separate head and ink tank (typically Canon and Epson cartridges) and compatible integrated cartridges where an empty OEM cartridge has typically been refilled. These are normally cartridges for HP and Lexmark printers. In addition, new market player Dell now badges Lexmark printers and hence uses the same integrated inkjet cartridge technology. Aftermarket products can also be refill solutions, where there is a way for the user to refill an empty cartridge and use it again. These types of cartridges can take several different forms, including a syringe, a refill station, or a click-in refill.

Market Size and Overview

The market for inkjet printers continues to climb, and 2003 shipments improved over 2002 levels. In total, InfoTrends/CAP Ventures estimates that there were just over 80 million inkjet printers installed in the market during 2003, and this number is expected to increase at a CAGR (Compound Annual Growth Rate) of 4.1% to reach 98 million units by 2008. The market has matured and growth rates for the installed base have slowed compared to a couple of years ago. Much of this market is now a replacement market, with users replacing older inkjet printers with newer models, frequently multifunctional devices that offer additional capabilities such as faxing and copying. Many users are also choosing to purchase photo printers to serve as dedicated standalone devices or inkjet printers that also offer quality photo output.

The installed base of the single-function inkjet printer market is expected to show a CAGR of -10.5% over the forecast period, shrinking from 72.2 million units in 2003 to 41.5 million units by 2008. Conversely the multifunctional portion of the market is projected to achieve a CAGR of 48%, rising from 7.9 million units in 2003 to 56.6 million units in 2008.

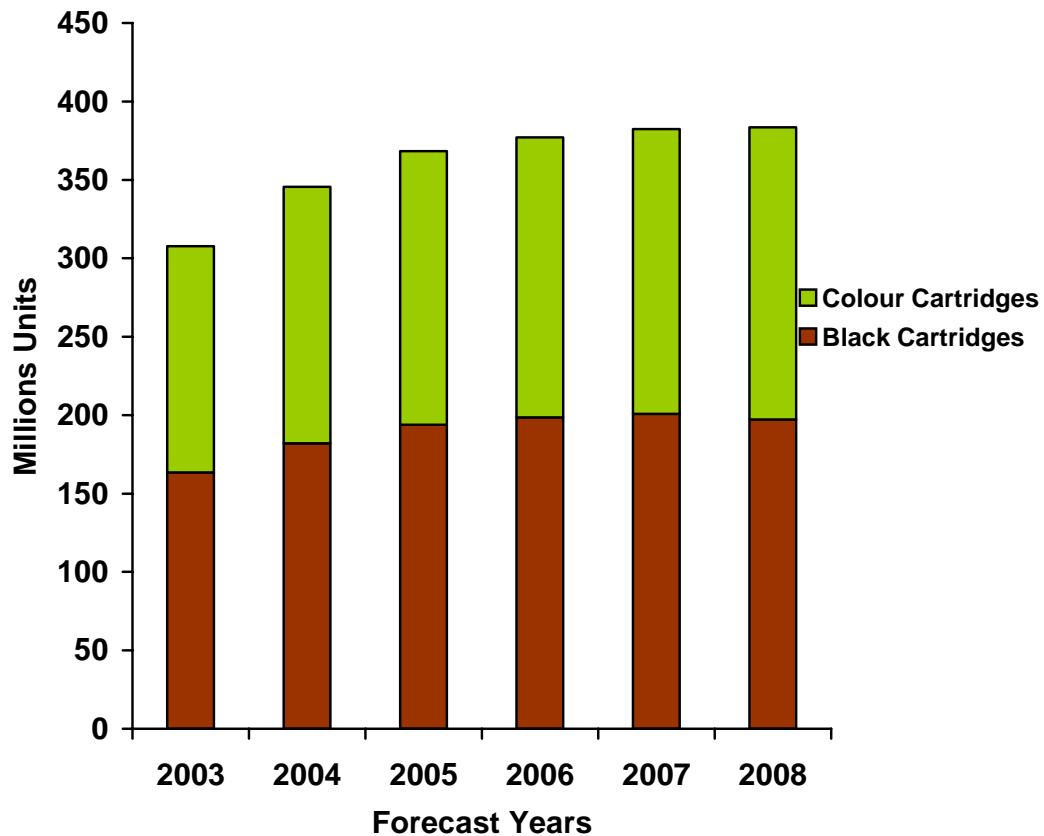
Figure 1: Western European Inkjet Installed Base – 2003-2008 (Thousands of Units)



The growth in applications such as photo printing is good news for the vendors of inkjet cartridges, as it means an increased demand for cartridges. Photo printing consumes a lot of inkjet ink, and typically needs all four colours to create a print. Nevertheless, the shift to multifunctional devices also means that users have the opportunity to work with additional types of documents, such as those created not only by printing but also by copying, faxing, and scanning. As the inkjet market develops, therefore, there will be a variety of applications that need varying levels of coverage as well as black & white and colour printing. The aftermarket has traditionally been strongest in the black cartridge market as there are less technical challenges to overcome in this area than with colour cartridges and inks, which can encounter issues with colour matching and bleeding. Nevertheless, the growth in colour applications like photo printing, transfer printing, and greeting card printing makes this an opportunity that the aftermarket will not want to miss out on, even though the black cartridge market will continue to be the lifeblood for many aftermarket players.

The total inkjet cartridge market is expected to demonstrate a CAGR of 4.5% over the forecast period, rising from 307.8 million units in 2003 to 383.6 million units in 2008. The colour portion of the market will likely show a CAGR of 5.2% and increase from 144.4 million units in 2003 to 186.4 million units in 2008, whereas black cartridges will achieve a CAGR of 3.8% and rise from 163.4 million units to 197.3 million units over the same timeframe. Although the colour cartridge market will continue to take share from the black cartridge market (demonstrated by its faster growth rate), black cartridges will still account for the majority of the cartridge market by the end of the forecast period. This is because despite the increase in applications like photo printing, the majority of output performed on an inkjet printer is still black & white document printing.

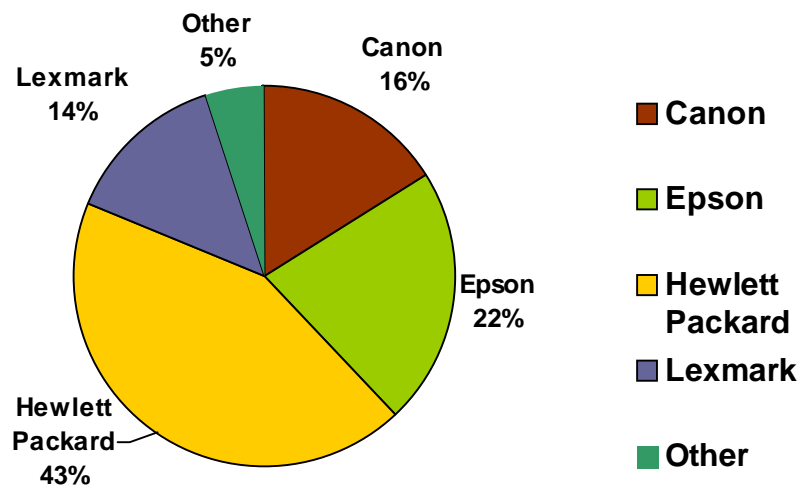
Figure 2: Western European Inkjet Cartridge Units – 2003-2008



The Figure below illustrates the installed base share for the key players in the inkjet printer market during 2003. These shares are based on shipment information that InfoTrends/CAP Ventures receives as part of its ongoing research into hardware market. The installed base data is then calculated using assumptions based on the likely life of the printers and their different retirement rates. There are many players in the laser printer market, but the inkjet market is limited to only a handful of players. Hewlett-Packard, Canon, Epson, and Lexmark accounted for nearly all of the devices in the inkjet market, although small quantities are still being shipped from players like Sharp and Olivetti. In addition, Xerox's discontinued inkjet printer lines continue to capture some share, even though they left the market in 2002. 2003 did see the entrance of Dell, a player that may have more staying power in the inkjet market than Xerox or Sharp. Although best known for its computer products rather than its peripherals, Dell has been ramping up its product line and currently offers a range of multifunctional inkjet devices as well as single-function machines targeted toward photo printing. During 2003, shipments of Dell printers accounted for just under 1% of total shipments, so whilst the company only has a small share of the market, it is likely to increase this share

given the rate at which it is launching new products. Nevertheless, whether Dell is capable of seriously rivaling the big four in terms of market share remains to be seen. Dell badges its inkjet printers from Lexmark, although the cartridges are keyed differently so that users cannot interchange inkjet cartridges across the two brands of printers even if they have the same engine. Like its other products, Dell sells its printers and supplies exclusively via the Web. The printers feature a warning system that notifies users when they are getting low on ink so they can purchase another cartridge. This can be done automatically over the Web, and given that this is the only way that Dell sells its printers, it is vital that this process is quick and convenient since consumers cannot obtain their supplies any other way.

Figure 3: Western European Inkjet Installed Base Share – 2003
80.2 Million Units



The market for the big four players has remained relatively stable in terms of rankings over the past few years, with HP remaining the market leader by a considerable distance. In terms of shipments, Canon has lost some of its share over the years, and although Lexmark is putting pressure on the company for third place, it has not yet been able to overtake Canon. For the inkjet aftermarket, it is very important for the players to know which brands and models are selling well. Nevertheless, the products that the aftermarket decides to offer not only depend on how successful a product has been in the market, but also on the type of aftermarket product that the company wants to offer, be it compatible tanks, compatible cartridges, or even a refill solution. The technology of the supplies can certainly affect which OEM products are targeted by the aftermarket. For example, HP inkjet printers use almost exclusively integrated cartridges and Epson uses only tanks.

The Inkjet Cartridge Aftermarket Segmented

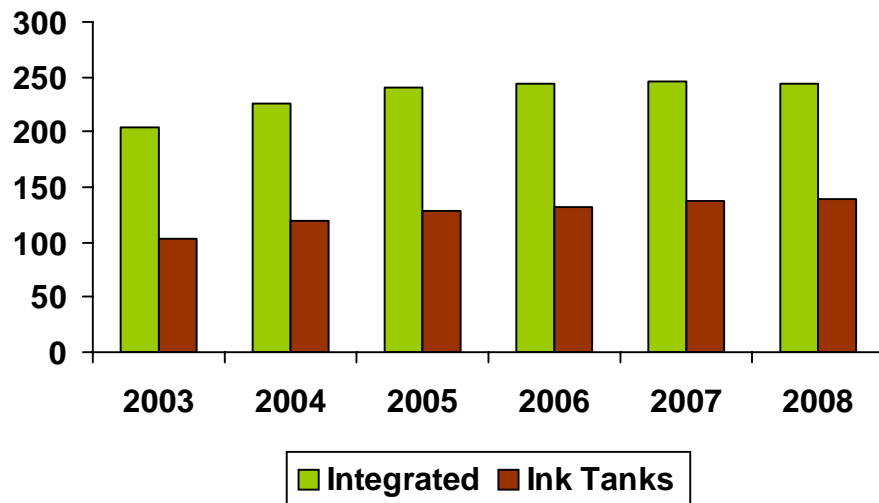
This section of the report looks in more detail at the inkjet cartridge market and the different segments that it contains, including integrated cartridges and tanks as well as the splits between OEM and aftermarket cartridges.

Integrated cartridges have a head and a tank that are integrated into a single unit, and the entire unit must be discarded when the inkjet cartridge is empty. Companies like Hewlett-Packard and Lexmark use these types of cartridges. Because the tank is separate from the printhead in inkjet tanks, the printhead does not necessarily need to be discarded when the tank is empty. The printhead will usually last for several ink

tank replacements. Epson exclusively uses tanks, while Canon uses tanks as well as some integrated cartridges. In its most recent introductions, however, Canon has been moving more towards tanks.

The integrated cartridge market will increase from 204.7 million units in 2003 to 244.1 million units in 2008, representing a CAGR of 3.6%. Meanwhile, the tank market will experience a CAGR of 6.2%, rising from 103.1 million units in 2003 to 139.5 million units in 2008. The integrated cartridge market is bigger than the ink tank market because HP, the dominant market leader, uses integrated cartridges in its products. Although it is currently a very small player, Dell may capture some additional market share as well since it also uses integrated cartridges (assuming that it continues to use Lexmark printer engines in the future). Although inkjet tanks account for a smaller share of the market, they are growing at a faster rate because of a couple of factors. First of all, Epson has gained some market share over the past couple of years. In addition, Canon is increasingly using tanks in its printer models. For example, the PIXMA printers that the company introduced this year all use ink tanks.

Figure 4: Western European Ink Cartridge Market – Integrated and Ink Tank (Non-Integrated), 2003-2008 (Millions of Units)



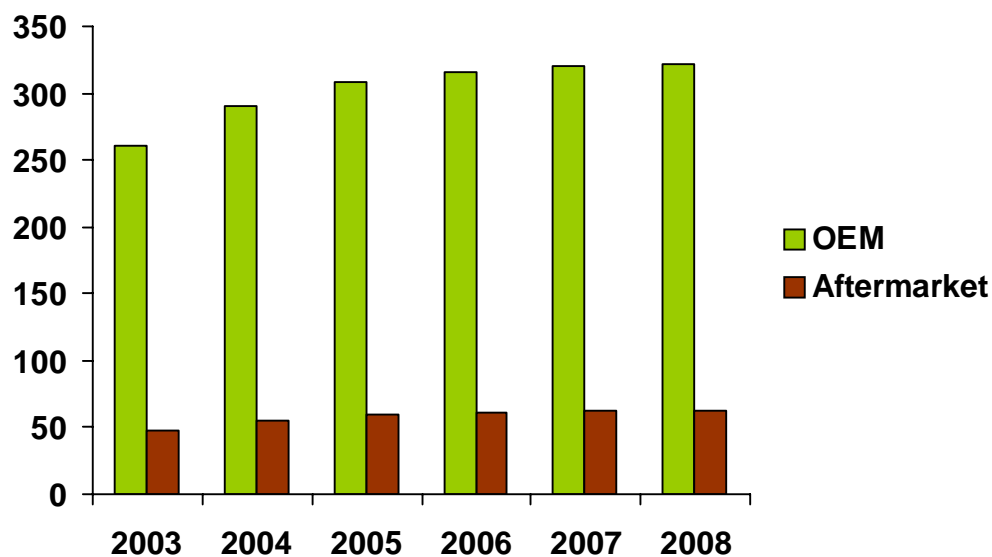
From the perspective of the aftermarket, it is easier to produce a compatible ink tank than it is to produce a compatible integrated cartridge. To produce an ink tank, the vendor only needs to supply a tank that clips on to the appropriate printhead. The vendor must also ensure that the ink is a suitable match for the printer it is going to be working with. The aftermarket supplier does not need to be concerned with the technology of the OEM printhead, only the tank and the ink. The tanks are typically simple affairs and can be previously used OEM tanks or compatible manufactured new tanks. Integrated cartridges, however, are much more complex. The aftermarket player has to have a source of empty cartridges to refill, or needs to be in a position to source a compatible manufactured cartridge, but this is only possible if the cartridge can be manufactured without infringing the OEM's patents. As a result, many remanufacturers prefer to use empty cartridges where possible. At the same time, however, even this method is not without its challenges as the empties have to be sourced. With the growing competition from remanufacturers, cartridge brokers, and OEMs who are increasingly tightening up on the collection of empties, it can be very hard to establish a consistent flow of good quality empties. Inkjet cartridges are quite delicate compared to toner cartridges, and it is fairly easy for the printhead to become damaged or clogged with dried ink to the point that it cannot be re-used. In fact, InfoTrends/CAP Ventures' research with cartridge brokers and remanufacturing companies suggests that up to 40% of empty inkjet cartridges cannot be refilled after a single use. The other alternative to refilling an integrated cartridge is to supply a refill solution for the empty cartridges. Such solutions have been in existence since the dawn of the inkjet refilling business back in the late 1980s. The most basic of these is the syringe, where users simply refill the cartridge with ink using a syringe. Other refill solutions include inkjet clicks and refill stations, which are more sophisticated ways to refill a cartridge and generally offer end-users an easy, non-messy way to refill their empty cartridges. At the same time, however, these cartridges are generally more expensive than syringes. Over the past

couple of years, we have seen the emergence of inkjet refilling stores such as Cartridge World, where users can take their cartridges to be refilled. They can either buy a cartridge that has already been refilled or wait and have their own cartridge refilled, depending on how the operation is set up. The benefit to this method is that the shop will generally have a specialist refilling the equipment to ensure that it is handled quickly and competently.

Due to the differences between offering an aftermarket tank or integrated cartridge solution, aftermarket players may decide to offer just one type of product. For example, some aftermarket players concentrate only on Epson and Canon cartridges because they only want to offer compatible tanks rather than compatible integrated cartridges or refill kits. Other players believe that they need to have an offering for HP devices, particularly if they are looking to sell their products through retail, as HP is the number one player in the market.

The aftermarket share of the inkjet cartridge market is expected to move from 47.6 million units in 2003 to 62.5 million units in 2008, demonstrating a CAGR of 5.6%. The OEM share of the market will expand from 260.2 million units in 2003 to 321.1 units in 2008, achieving a CAGR of 4.3%. During 2003, the aftermarket accounted for 15.5% of the total market. Over the forecast period, the share of aftermarket cartridges is expected to increase slightly to just over 16% of the total by 2008. Of course, this share will vary by company, and some OEMs will be more affected by the aftermarket than others. For example, HP is more affected than Lexmark, because although both companies use integrated cartridges, HP has a much bigger market share, which makes it more attractive to the aftermarket industry. Epson is also highly targeted because it uses tanks, which are easier for the aftermarket to produce, and also because it has a sizable market share.

Figure 5: Western European OEM vs. Aftermarket Inkjet Cartridges – 2003-2008 (Millions of Units)

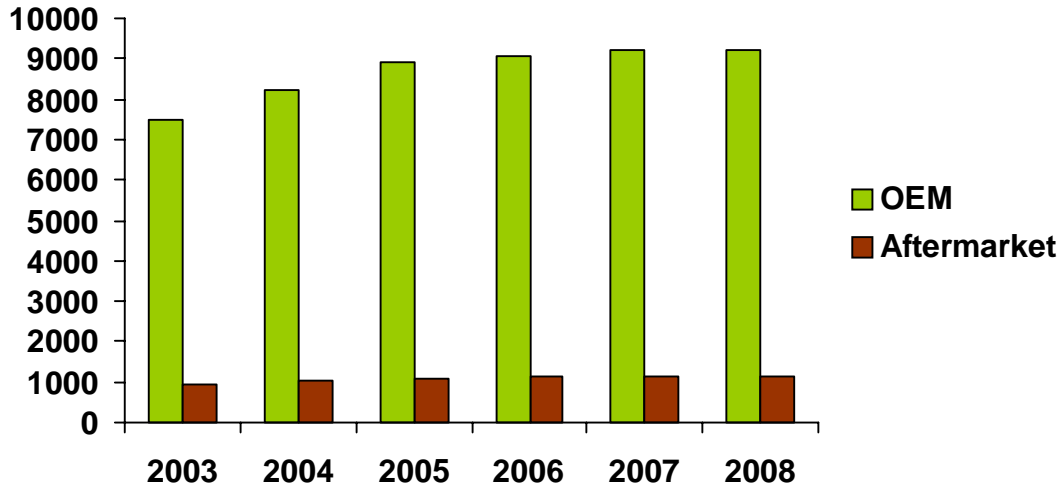


OEM cartridge revenues are expected to increase from €7.5 billion in 2003 to €9.2 billion in 2008, demonstrating a CAGR of 4.2%. The aftermarket, meanwhile will experience a CAGR of 3.9% over the same period, expanding from €943 million in 2003 to €1.13 billion in 2008. In terms of market share, aftermarket inkjet cartridge revenues accounted for about 13% of the total market in 2003. This share is lower than it is for units as the aftermarket cartridges sell at lower prices than OEM cartridges. Additionally, inkjet aftermarket cartridge prices are predicted to remain quite flat, as they need to be pegged at a certain level under OEM prices to stay competitive. In addition, the market is seeing increasing price pressures due to competition in the Far East, particularly China. The number of inkjet refilling companies in this region is growing and the volumes of cartridges that vendors are producing is increasing due to demand from the Far East and beyond. Recycler Magazine reports that Global Sources (www.globalsources.com), an organisation that provides information to help business partners trade with particular emphasis on the

Asia/China region, has done some work on the aftermarket inkjet market in the region. This includes tracking the prices of compatible inkjet cartridges in the region, where it has seen a decline in the unit prices of cartridges. It also estimates that mainland China had around 300 inkjet cartridge remanufacturers in 2003, and that this number increased dramatically during 2004.

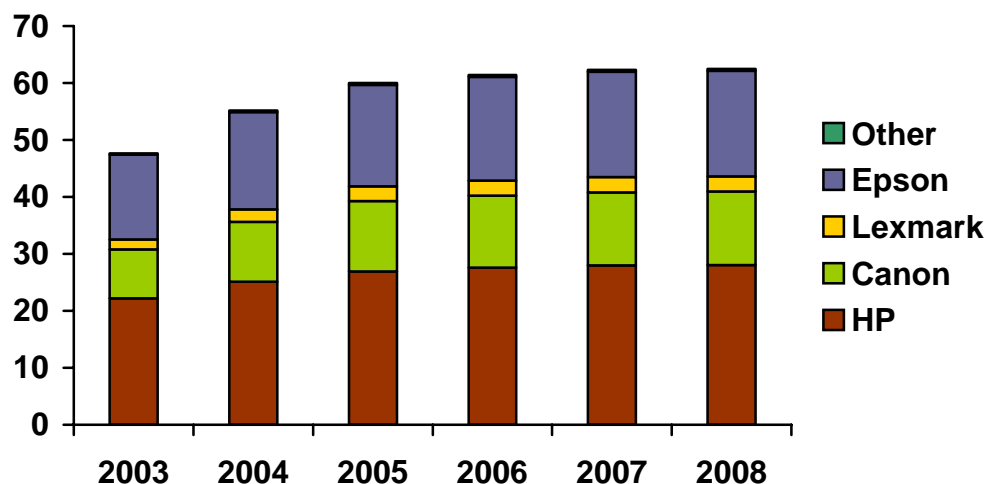
Naturally, such competition from the Far East puts pressure on manufacturers in Europe and helps to keep prices down. This also has repercussions for other elements of cartridge refilling such as ink, parts, and empty cartridge prices.

Figure 6: Western European OEM vs. Aftermarket Inkjet Cartridges – 2003-2008 (€Millions)



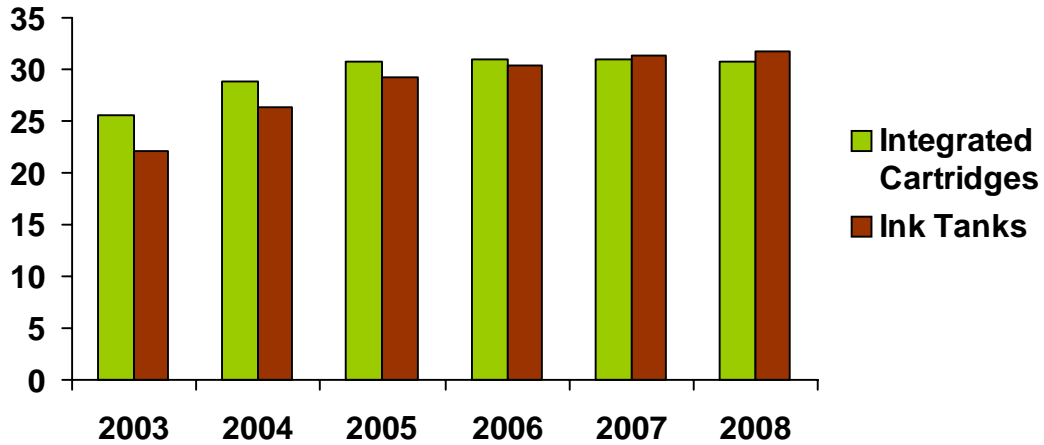
Not surprisingly, aftermarket products for HP devices account for the largest share of the market, which is primarily because the company has such a large installed base and is very attractive to the market. The aftermarket for HP claimed about 22.2 million units in 2003, and this number is expected to increase at a CAGR of 4.8% to reach just over 28 million in 2008. Epson products had the second largest share, partially due to the company's relatively large market share and partially because its products use tanks. Aftermarket inkjet products for use in Epson devices will increase from 14.9 million units in 2003 to 18.5 million units in 2008, demonstrating a CAGR of 4.5%. The number of aftermarket inkjet cartridges for Canon devices will increase from 8.6 million units in 2003 to 12.9 million units in 2008, representing a CAGR of 8.4%. Canon-compatible aftermarket products are expected to grow at a faster rate over the forecast period because Canon is increasingly switching its inkjet cartridges to tanks, and this makes the company more attractive to the aftermarket. Aftermarket inkjet cartridges for Lexmark devices will continue to account for a small part of the market, partially because Lexmark's installed base is lower than others and also because the company uses integrated cartridges, which present a tougher challenge to the aftermarket. Lexmark's aftermarket cartridge volume stood at 1.72 million units in 2003 and will rise to 2.69 million units in 2008, showing a CAGR of 9.3%. Lexmark's growth rates are higher than those for HP or Canon, but it is important to remember that Lexmark numbers are starting from a small base. In addition, the company's installed base is growing, which will generate some interest amongst remanufacturers. At the same time, however, InfoTrends/CAP Ventures does not anticipate that the company's share will grow significantly over the forecast period.

Figure 7: Western European Inkjet Aftermarket Units by OEM Brand – 2003-2008



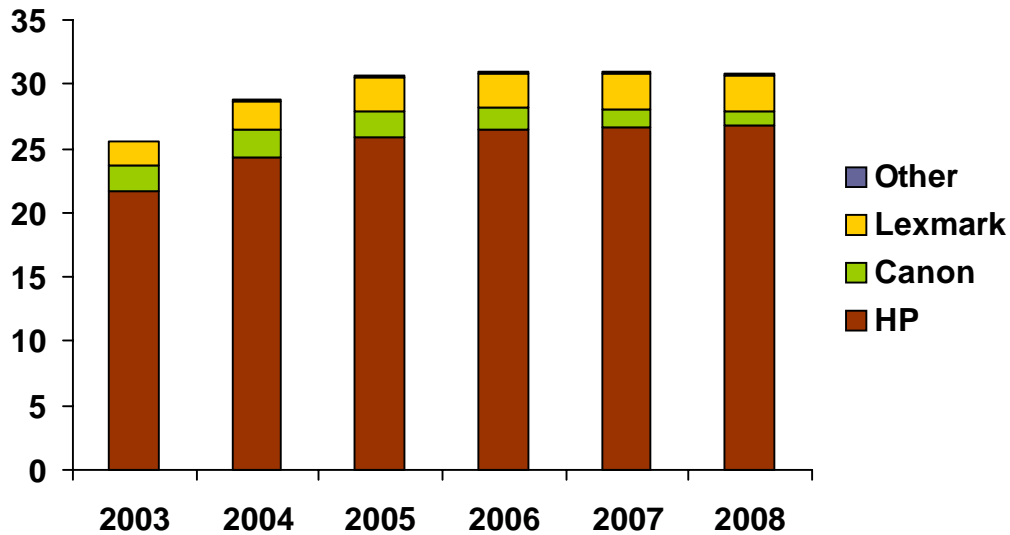
As is shown in the Figure below, there were more integrated cartridges in the aftermarket than ink tanks at the beginning of the forecast period. Integrated cartridges reached 25.6 million units in 2003, and this number is expected to increase to 30.1 million units by 2008 (3.8% CAGR). Over the same timeframe, the tank market will rise from just over 22 million units in 2003 to 31.7 million units in 2008, demonstrating a CAGR of 7.5%. The share of inkjet tanks in the aftermarket portion of the market will surpass the total inkjet cartridge market by the end of the forecast period, partially because companies like Canon are using more tanks. In addition, Epson inkjet products continue to be an attractive proposition for the aftermarket. Nevertheless, as it is becoming more difficult to find sources of empty cartridges and due to the patent problems associated with producing compatible products for newer inkjet cartridges, compatible tanks will become increasingly attractive to the aftermarket. Integrated cartridges will continue to be significant, however, due to the strength of the HP brand and the market potential of companies like Dell. Unless Dell becomes a major player in terms of installed base, however, the company is unlikely to be targeted by the aftermarket to any great degree.

Figure 8: Western European Inkjet Aftermarket – Integrated vs. Ink Tanks, 2003-2008 (Millions of Units)



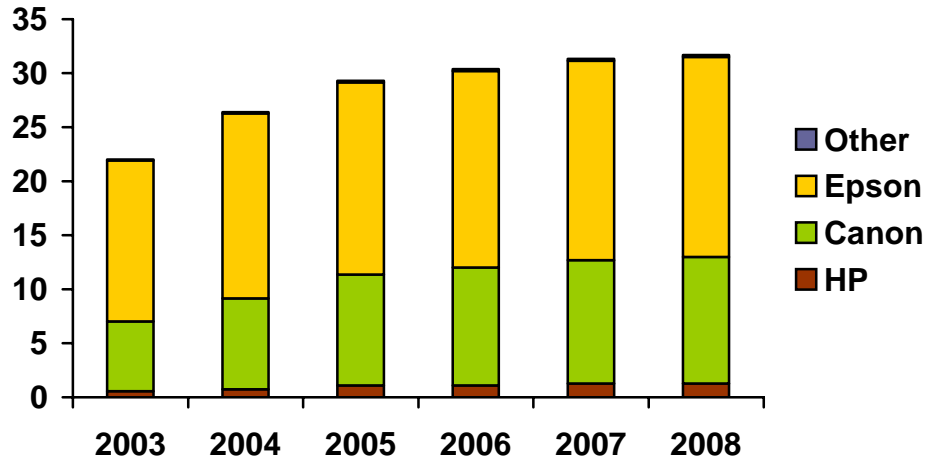
In the integrated cartridge aftermarket, HP will account for the majority of the share of the market with 21.6 million units in 2003. This number is expected to reach 26.8 million units in 2008, representing a CAGR of 4.4%. Epson does not use integrated cartridges and Lexmark is not targeted by the aftermarket in the same way that HP is. The non-HP integrated cartridges are expected to remain very flat over the forecast period, accounting for 3.99 million units in 2003 and 4.01 million units in 2008. As a result, we expect the majority of this market to be attributed to HP-compatible cartridges over the forecast period.

Figure 9: Western European Inkjet Cartridge Aftermarket – 2003-2008 (Integrated Cartridges by Brand)



The inkjet aftermarket ink tank market is dominated by Epson, with the number of tanks for Epson devices rising from 14.9 million units in 2003 to 18.5 million units in 2008 (4.5% CAGR). Lexmark devices do not use inkjet tanks. Aside from Epson, the remaining market for compatible inkjet tanks will grow from 7.3 million units in 2003 to 13.2 million units in 2008. This market is experiencing greater growth than the integrated cartridge aftermarket because Canon is switching to more tank usage. Assuming that this trend continues, Canon products will become increasingly attractive to the aftermarket.

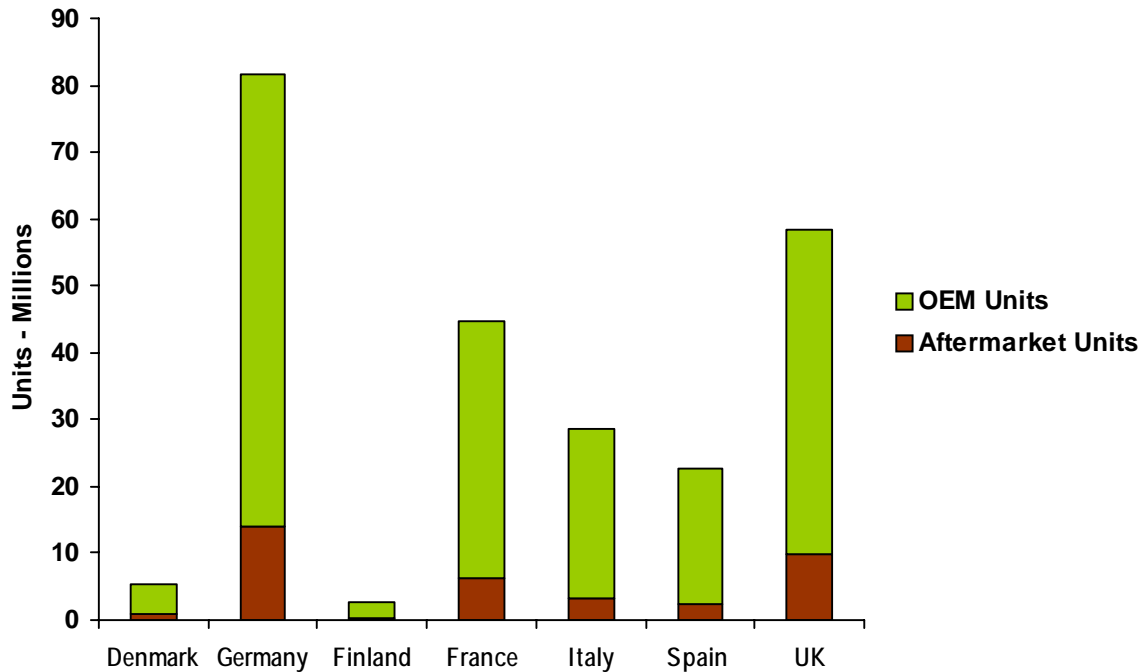
Figure 10: Western European Inkjet Cartridge Aftermarket – 2003-2008 (Ink Tanks by Brand)



Penetration of the Aftermarket by Country

Although the aftermarket share of the inkjet cartridge market for total Western Europe stands at around 15%, there are some differences between countries. The aftermarket is penetrating some countries at a higher level than others. This can be attributed to several factors, including how environmentally aware the population is, how likely they are to refill a product or purchase one that has been refilled, what sort of aftermarket products are available in the country, how established the refilling business is in that country, and how many big players there are in the market. For example, the U.K. and Germany are home to some of the biggest inkjet remanufacturing companies and therefore see higher rates of inkjet aftermarket penetration. Italy and Spain have lower penetration rates of aftermarket inkjet cartridges, partially because the industry became established in those locations at a later point. As a result, there are fewer big homegrown players in the market, and Southern Europe is traditionally less environmentally aware than other parts of Europe, particularly the German-speaking countries and Scandinavia. This is beginning to change, however, in part because of the pressure of EU (European Union) laws.

Figure 11: Inkjet Aftermarket Penetration by Country



Country	Denmark	Germany	Finland	France	Italy	Spain	U.K.
Aftermarket Penetration %	14	17	14	14	11.5	10.5	17

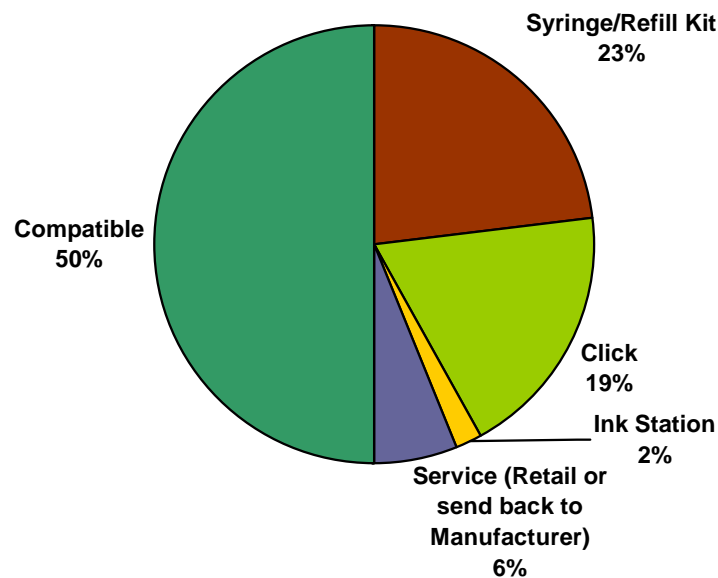
Types of Inkjet Refills

Users who purchase aftermarket products have a variety of options, which will depend on the brand of printer they have as well as their own personal preference. This section discusses the different types of inkjet refill methods that are currently available.

Syringe/Refill Kit

The syringe is the most basic type of refill kit. With this method, the consumer uses an ink-filled syringe to refill the cartridge themselves. Syringes or refill kits are normally used for refilling integrated cartridges from companies like HP and less typically Lexmark. For the aftermarket, these kits represent an alternative to producing a compatible cartridge. The syringe typically comes with a tool that enables the user to make an opening in the cartridge and thus refill the cartridge. Although vendors of these inkjet refill kits have done their best to make them as user-friendly as possible for consumers, they can be messy if the inkjet cartridge is not fully empty when refilled because this will lead to overspill of ink. Additionally, such kits assume that users are confident about refilling their empty cartridges, and this is not always the case. Syringe kits were one of the first refill solutions to come to the market and although their popularity has dipped, they have remained common because they are relatively easy for suppliers to produce and do not entail the patent issues that are associated with producing integrated compatible cartridges. In addition, they also provide a convenient way for consumers to refill at home (or less typically at work) at a low cost. Inkjet refill syringes typically come in one of two types: those where the syringe is geared towards specific models (i.e. the ink is suitable for a particular range of models), and universal inkjet refills that can be used to refill any ink cartridge. The universal inkjet models are more likely to be available for black cartridges than for colour, due to the complications associated with producing a universal colour ink that will work across a range of models. One of the best-known brands of inkjet syringes on the market is from JR Inkjet.

Figure 12: Estimated Inkjet Refill Market Split by Refill Type - 2003



Compatible Inkjet Cartridges

Compatible cartridges resemble OEM cartridges, but in fact are produced by an alternative or aftermarket supplier. The most common types of compatible cartridges are tanks for non-integrated cartridges, where the tank and head are separate. Unlike integrated cartridges, a compatible tank is straightforward affair because it is basically a plastic case of ink with no complex parts; all of the technology is in the printhead. Tanks are popular with many aftermarket suppliers and are most commonly used in Epson printers. There are also some compatible products for integrated cartridges on the market. These come in two different types, the first of which is a refilled product. To create a refilled product, the remanufacturer needs to have a supply of good quality empty cartridges with non-damaged printheads. This is not always possible given the competition in the market for empty cartridges and the fact that OEMs have stepped up their efforts to collect empty inkjet cartridges themselves. Because of this, some aftermarket companies do not offer remanufactured integrated inkjet cartridges as they worry about not being able to guarantee the volume and the quality of the cartridges over time. The other alternative for offering a compatible cartridge is a newly built inkjet cartridge. This method has its challenges as well, as the aftermarket manufacturer must be sure that it is not infringing any patents. In addition, the company must have the technological know-how to manufacture a complex piece of engineering from scratch. OEMs in Western Europe are very vigilant about monitoring patent infringement by aftermarket players, but this is not always the case in other parts of the world where the legal framework applying to patents is less rigid. For example, some companies offer integrated compatible cartridges in other parts of the world because they know that they would be prosecuted for selling them in Western Europe. Q-Imaging is an example of company that deals primarily with new build integrated cartridges, mainly for the HP market.

Clicks

Clicks are inkjet cartridge refill solutions that users can handle themselves. They were developed as an alternative to the syringe for integrated cartridges to provide users with an easier, neater way to refill cartridges than the potentially messy ink syringe refills. They are typically sold in packs of two or three clicks, plus an adaptor (actually an adapted integrated cartridge) that enables the refill ink click to be clipped into the ink well of the cartridge. Two of the best-known vendors of click solutions are Armor and Pelikan.

Ink Station

This solution is a type of mini-inkjet refilling machine. Such devices have not been popular for users who use only small numbers of cartridges (i.e. home-based consumers), because low consumption does not really warrant the outlay of the device. Nevertheless, these solutions can be useful where a larger number of refills is needed on an ongoing basis, like in an office or another commercial environment. On the whole, however, this solution does not constitute an important part of the inkjet refilling scene.

Service

The inkjet service category has changed a great deal over the past few years. Whereas service in the past was mainly limited to users sending off empty cartridges to be refilled and accounted for a very small percentage of the inkjet refill market, the arrival of inkjet refilling stores has changed this. The biggest of these refill chains is Cartridge World. This company's primary European market is the U.K. where it has over 260 outlets, but it also has stores in Austria, Belgium, France, Germany, Greece, Ireland, The Netherlands, and Spain. Users can take their empty cartridges into these stores to have them refilled, or they can buy aftermarket inkjet cartridges. InfoTrends/CAP Ventures estimates that these refilling stores accounted for about 6% of the inkjet aftermarket during 2003, but this percentage is expected to increase in the future. In terms of the aftermarket, this channel is most likely to take share away from the Do-it-Yourself syringe inkjet refill market, because users will be able to ask somebody else to refill their cartridges rather than doing it themselves. The cost of a refilled cartridge in a store such as Cartridge World is about half the price of the original. Some believe that the presence of refill stores may encourage users who normally only use original OEM inkjet cartridges to try a refilled product.

Key Issues

This section of the report looks at some of the key issues that are impacting the inkjet cartridge aftermarket as a whole and how they are affecting the inkjet cartridge aftermarket in particular.

Collection of Empties and Environmental Issues

The collection of empty cartridges is very important to the cartridge refilling industry as these are the basis of the remanufactured or refilled aftermarket product. Traditionally, it has been harder to collect empty inkjet cartridges than empty toner cartridges. This is because a high proportion of inkjet printers are used in the home, which makes it more difficult to organise collection schemes. Collection schemes for toner cartridges have typically been organised via the office, as this is where most laser printers are used. As there is often more than one device that uses toner cartridges in the office, the collection can be organised in various ways. Users can gather up the empty toner cartridges and ship them back to the vendor, or the empties can be collected on-site. The inkjet market is somewhat different; it is not viable to organise on-site collection schemes for inkjet cartridges in the home as the volumes of cartridges are too small and the number of locations is too large. Some aftermarket players have been working to organise collection schemes for empty cartridges in public places such as libraries, shopping centres, supermarkets, and schools and colleges, but these methods can only collect a small percentage of the empty cartridges that become available. Many are simply thrown away by the users. Naturally, the collection of empty inkjet cartridges is particularly important for remanufacturers who deal with integrated cartridges and use empty inkjet cartridges, which must be in good condition to be refilled. InfoTrends/CAP Ventures estimates that up to 40% of the empty cartridges that are collected cannot be re-used. The market for empty cartridges has become more competitive over the past 5-7 years, as the number of cartridge brokers who have entered the market has grown. Cartridge brokers buy and sell empty cartridges and can have a big impact on the flow of empty cartridges, in terms of how many are available in the market as well as their price. The collection market has become more complex, and the methods that it uses to obtain empty cartridges have become more sophisticated. Users are actively marketed as well, and are told that they can earn money for their empty cartridges, either as a rebate or in the form of a donation to a particular charity. Remanufacturers as well as cartridge brokers have begun to use the charity connection to help boost the collection of empties. Some OEMs also have links with charities. For example, Canon formed a partnership with the World Wildlife Fund (WWF) when it first began to collect used toner cartridges.

Hewlett-Packard's decision to step up the collection of its empty inkjet cartridges has certainly caused concern in the inkjet aftermarket this year. The company is currently including postage-paid return envelopes for the 56 and 57, two of its newer and more popular cartridges. Users simply place the used cartridges in an envelope when they are empty and post them in the regular mail. Consumers that have cartridges other than the 56 and 57 can go online and order pre-paid labels to send those cartridges back. HP launched its scheme in the German-speaking areas of Europe (i.e. Germany, Austria, and Switzerland) as it wanted to have its logistics and recycling processes working smoothly before rolling the send-back scheme out to other countries. Naturally, a collection scheme such as this is bound to have an impact on the number of empty 56 and 57 cartridges available in the market, as it requires minimal effort on the part of the end-user.

With the growing emphasis on the recycling of products, whether printers or cartridges, OEMs will increasingly be seeking ways in which they can simplify the collection and recycling of products. Although such schemes are often expensive to set up and require extensive efforts to get the marketing and logistics right, they have the added bonus for OEMs that they remove empty cartridges from the open market, so increasing the difficulty for cartridge remanufacturers and brokers to find empty cartridges.

Waste Issues and Empty Cartridges

Aside from the issues involved in sourcing empty inkjet cartridges, there are other challenges involved with buying and selling them. For example, moving empty inkjet and toner cartridges around Europe on a daily basis is a complex and costly process. The remanufacturing industry wants cartridges that are collected under a single product collection programme between two parties to be treated as products with "green status" rather than waste. Products with green status should be allowed to travel around Europe freely.

The key to cartridges being treated as non-waste is what happens to them when they are empty. If they are simply put into a trash bin, this makes a statement that they are considered waste. If they are kept for recycling purposes and then processed in a way that is compatible with recycling, however, the empties would undergo an inspection to determine which cartridges could be re-used and treated as commodities. The remanufacturing industry is currently campaigning at the EU level to get this policy changed.

At this point, it is very complex to transport empty cartridges across Europe. Despite the fact that environmental legislation should be applied equally around the EU, there are in fact many differences between countries in the way that they classify waste and the paperwork that is required before a cartridge is released from or allowed entry into a country. This increases the time needed to ship empty cartridges around Europe and thus adds to the costs.

Update on the WEEE Scrap Waste Scheme

Despite lobbying by the cartridge remanufacturing industry, it appears that the WEEE (Western European Electrical and Electronic) Scrap Waste directive will not include printer cartridges as part of its coverage. The remanufacturing industry was hoping that the ruling would make it illegal to send empty toner and inkjet cartridges to landfills, therefore legitimising their industry and forcing all empty cartridges to be at least inspected for refilling and potentially remanufactured by the aftermarket or the OEMs. The OEMs were against this ruling, although they realised that the pressure to dispose of empty cartridges responsibly would intensify. This is likely the reason that we have seen an increase in many companies' cartridge collection schemes. Whilst the remanufacturing industry will continue to lobby for a change in the WEEE directive over the longer term, these companies are also hoping to get cartridges included in the new EuP directive, which is discussed below.

Eco-Design of Energy-Using Products

The new EuP (Energy-Using Products) directive considers the way in which products, which are consumers of energy, are designed. The remanufacturing industry is lobbying the EU commission to get toner and inkjet cartridges included in this directive, so that OEMs will be forced to manufacture products that can be re-used. Criteria for the directive are still being drawn up, and it is not yet known whether cartridges will be part of this.

This life cycle analysis will cover the following issues:

- Raw Materials
- Acquisition
- Manufacturing
- Packaging
- Transport and Distribution
- Installation and Maintenance
- Use
- End of Life

Nevertheless, this directive is still years away from implementation. The aftermarket argues that cartridges should be covered because they are manufactured items. Nevertheless, it appears that the OEMs will get their way, as cartridges are not covered in the WEEE as it now stands.

Smart Chips

Although vendors continue to use smart chips, much of the controversy surrounding them has died away. This is because there has been virtually no backlash from OEMs in Europe against the aftermarket for finding ways to overcome the chip challenge. Instead, the aftermarket simply overrides and re-sets the chips when filling empty cartridges, replaces the chip, or does not use a chip at all (although the user may lose some of the functionality of the printer in this case). The price of chips has come down because more companies are manufacturing them and the demand has grown. The chips still create an additional step in the refilling or production of an aftermarket inkjet cartridge, which adds to the cost and time to develop an aftermarket inkjet offering. Nevertheless, these chips have not been the death knell to the remanufacturing industry as many predicted.

At the same time, however, the remanufacturing industry has had some setbacks in connection with the electronic smart chips used by OEMs. These vendors were lobbying to get the chips classified as an impediment to recycling as part of the WEEE directive, so that OEMs would be forced to abandon them. Although the WEEE directive does not currently view supplies products as waste under the terms of the current directive (unless the cartridge is still in the hardware device at the time that the hardware device reaches the end of its life), the remanufacturing community wanted to lobby for this change at an early stage of any possible discussion on supplies being included as part of the Directive.

Dell also uses smart chips in its inkjet printers. Smart chips are an important component for Dell because its customers can only purchase new supplies via the Internet. Dell uses its smart chips to create a user-friendly method of notifying the user when supplies are running low so that the consumer can easily purchase new consumables. The Dell inkjet printers with chips include the 540 Photo, 922, 962, 942, A960, 720, J740, A94, and A920.

Conclusion

The inkjet cartridge aftermarket industry continues to hold its share in the overall inkjet market despite the many challenges that are facing the industry. Aftermarket players are being forced to come to grips with the new technologies in the printers and supplies that OEMs are releasing at ever-greater frequency, and also need to comply with environmental directives. These companies also need to source empty cartridges and are facing increasing competition from the Far East market. Meanwhile, OEMs are coming to grips with the fact that the aftermarket represents legitimate competition that is here to stay, but this is not to say that OEMs will not take measures to protect their supplies markets. Moving forward, one of the greatest challenges for the industry will be the increasingly stringent environmental regulations that will impinge on all areas of business, including sourcing and moving empties, waste management, and recycling.

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