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# PRIMARY RESEARCH

## WEU CARTRIDGE COLLECTION & RECYCLING REPORT 2020

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## Executive Summary

This report presents the results of a research program by InfoTrends to investigate cartridge collections, usage and disposal practices for remanufactured and newly made compatible (NBC) ink and toner cartridges. InfoTrends interviewed 20 remanufacturers and resellers of newly built compatible cartridges. The following is a glossary of terms used in this report.

### Glossary

- **Empties collector:** A company that buys and sells empty cartridges.
- **A captive empties collector** is owned by a remanufacturer. They are a profit center to the parent company and will supply primarily to the parent company as well as the aftermarket when excess empties are on hand.
- **Independent empties collectors** are an independent business and serve the remanufacturing industry overall.
- **New Build Compatible (NBC):** A 3rd party replacement cartridge that does not use an empty cartridge from an OEM, but rather uses a newly molded cartridge shell and internal parts.
- **Clone:** NBC that violated patents
- **Empty:** A used cartridge that might be suitable for re-use or recycling.
- **Extra - Wrong Vendor:** Cartridges from vendors that the remanufacturers do not accept
- **Final Disposition:** What happens to a cartridge at the end of its life (sent to landfill, recycled, waste to energy (W2E))
- **Landfill:** Use of municipal waste. Municipal solid waste is commonly known as trash or garbage (US), refuse or rubbish (UK) is a type of waste consisting of everyday items that are discarded by the public. Depending on local laws, trash or rubbish may be buried untreated or may first be incinerated before the ashes are disposed of based on local laws. Some municipal waste incineration may also be W2E. However, measuring that mix is beyond the scope of this study.
- **Non-Virgin Empty:** An empty cartridge that has previously been remanufactured
- **Bad Non-Virgin Empty:** A non-virgin empty that cannot be successfully remanufactured or one for which there is no market.
- **Good non-Virgin Empty:** A non-virgin empty that can successfully be remanufactured.
- **Recycling:** Crushing or melting components for use in other products or industries.



- Remanufacturing Recycling Ratio: Share of remanufactured cartridge waste that is recycled rather than sent to a landfill or incinerator.
- Remanufacturing: The practice of cleaning, servicing, refilling, and re-using cartridges.
- Virgin Empty: An empty cartridge that has not been remanufactured.
- Bad Virgin Empty: A virgin empty that cannot be remanufactured or one for which there is no market.
- Good Virgin Empty: A virgin empty that can successfully be remanufactured.
- WEEE2 (WEEE = Waste of Electronic and Electrical Equipment) European law which includes regulation on what accounts for electronic waste, now includes cartridges as part of electronic waste

### Key Findings

- NBCs continue to gain share and are impacting remans the most. But they drive prices down across the board
- While respondents suspect that there is some collection of NBCs, they can't point to any particular example.
  - Reman respondents are not happy with what they see as NBCs avoiding e-waste regulations while the cost of compliance and the price pressures from NBCs is continuing to apply economic pressure on the reman industry
- Remans have achieved 10% landfill for their won waste but further improvements will be very hard to achieve due to low landfill rates already and economic pressures on remans.
- Recycling and W2E about even in terms of final disposition of reman waste
- Little otherwise has changed from 2018
- OEM collection programs still are not seen as a threat to remans.
- The volume of NBCs in the market has increased even in the B2B channels
  - Larger remanufacturer respondents focus on higher end market and they now see more toner NBCs in the dealer channels
  - Economic viability for remanufacturers to compete against NBCs for both with toner and inkjet is of major concern
  - Collectors and remanufacturers diversify to survive, get acquired or go out of business
  - Strong worry the domestic reman industry is about to collapse



- Inkjet continues to be overrun with NBCs
- Fear of Chinese takeover of the industry while OEMs focus on reducing remanufacturers' efforts is of major concern
  - Complaints about lack of OEM focus on suing illegal cloners
  - Strong resentment among remans that Chinese are not following the same environmental rules that the remans follow
- Remans hope that Chinese product will be required to follow the same environmental requirements and possibly increase their prices as a result
- WEEE-2 is creating greater need for collection and waste management
  - Some are sceptical that it will be enforced by country
  - Others see legal take back as key opportunity to set up waste management and charges for it
  - Should lead to increased prices especially for clones that to date do not factor in disposal

## Newly Built Compatible Findings

In speaking with the industry, it is clear that almost all newly built compatible cartridges end up being thrown out by the users. Any collections of NBCs are unintended and accidental collections by the remanufacturing industry. Remanufacturers will not remanufacture an NBC due to concerns about patents as well as concerns about the quality and reliability of such a product. Furthermore, replacement parts for remanufacturing Original cartridges may not suit perfectly for NBC's and the supply industry does not provide replacement parts for NBC's specifically.

Remanufacturers attempt to minimize this unintended collection but when it does happen the waste materials are recycled, sent to waste to energy or landfilled through the same process that the remanufacturer has for all of its waste and so the ratios for landfill, W2E and recycle below mirror what remanufacturers do with all of their waste materials. Remanufacturers believe that NBCs use cheaper plastics than do OEM cartridges and so as raw material are of less value.

- Respondents believe that some NBC manufacturers are starting to collect back empties mainly if their cartridges are sold in the B-to-B. Volumes still considered to be very small
- NBC producers wish to be able to supply to government and large business tenders with takeback scheme in place



- Unable to point to a specific program or producer.
- Still very small quantities involved
- Clones mainly found in Internet channels but increasingly found in reseller (tier 2) and just starting to see in tenders
- Accidental collection while steady, is expected to increase particularly for toner as NBCs make headway into B-to-B channels.
- Remans increasingly policing cartridge collections to screen out NBCs
- Major remanufacturers do not want to deal with NBCs as they are regarded as
  - Low quality/unreliable
  - Possibly patent infringing
  - Possibly containing toxic chemicals
  - Susceptible to OEM firmware updates
  - Possibly illegal and cheaply made

## Remanufacturer findings

### What happens to cartridges that remanufacturers collect but can't use or sell?

Remanufacturers need to collect empty cartridges to remanufacture them and not all collected cartridges are suitable for use. The table below provides our estimates on what the remanufacturing industry does with cartridges and components that they cannot use or sell.

- WEU continues to lead the U.S. in reduction in landfill, for both cultural and legal reasons
  - Governments/ EU through waste laws and WEEE2 push towards reduction in landfill- promoting reuse and recycling- in some cases even at municipal waste level
  - Some suspect landfill is greater than reported - E Europe and Southern Italy are known dumping grounds for W European unwanted empties but this is not measured
- Preference to incineration (often for waste to energy) has been far greater in WEU due to some countries where landfill no longer happens & more facilities had become available



- But recycling to raw material is increasingly the aim of major remanufacturers although it costs a lot
  - Recycling of waste is still more costly than throwing out (Remans have little profit to waste)
  - Bigger players are also shifting toner cartridges over to recycling of raw materials from incineration and several report 100% recycling to raw materials
- Desire of Remans to promote REUSE continues but they realize that end of life solutions will be required but worry about the costs
  - See the NBCs as unfair competition

**Table 1: What happens to cartridges that remanufacturers collect but can't use or sell?**

	2020
Laser	
Landfill	10%
Waste-to-Energy	46%
Recycled	44%
Total	100%
Inkjet	
Landfill	10%
Waste-to-Energy	49%
Recycled	41%
Total	100%

**Unusable Remanufactured cartridge collections**

Remanufacturers need to collect more cartridges than they can actually use because some collections are damaged or unusable because they were previously remanufactured by a different remanufacturer, an NBC, or of a type of cartridge that simply is not remanufactured.

Virgin empties have a lower defect rate than non-virgins, but remanufacturers primarily remanufacture virgin cartridges as opposed to non-virgins, so virgin represent a higher share of total bad collections than non-virgins.



Remanufacturers also accidentally collect cartridges that are simply not usable because they may be NBCs, simple toner cassettes and even toner bottles that they typically do not remanufacture.

On the inkjet side a significant volume of collections are bad-wrong vendor because many are ink tanks from vendors where the cartridges are not remanufactured. However, those number had been higher as there is more remanufacturing on ink tanks now than in the past.

- Mix of “bad” collections is largely stable. Little change ratio of “good” vs “Bad” virgins and non-virgins. Little change in use of virgins vs non-virgins.
- The mix of total collections that are unusable is a combination of the ratio of virgins and non-virgins that the remanufacturers remanufacture and the differing defect rates for virgins and non-virgins. Non-Virgins are more likely to be unusable than virgins due to a variety of factors but sever damage and excessive wear are primary.
- The primary struggle faced by European remanufacturers has been keeping NBC's out of their collections. So far, they have been able to keep the problem manageable but fear that as more NBCs get into traditional channels that the problem will increase.
- They resent that Chinese producers are not collecting their empties and are increasing the burden the remans.

The table below shows the percentage of all collections that are bad /unusable for the three types described above.

**Table 2: Unusable Remanufacturers cartridge collections**

	2020
Laser	
Bad Virgins	8%
Bad Non-Virgins	4%
Subtotal	12%
Bad-Wrong Vendor	7%
Total	19%
Inkjet	
Bad Virgins	12%
Bad Non-Virgins	3%
Subtotal	16%
Bad-Wrong Vendor	9%
Total	25%



## Remanufactured Cartridges that are remanufactured only once Remanufacturers prefer

Remanufacturers prefer to work with virgin cores rather than previously remanufactured cartridges because it's less expensive to work with virgin cores due to the predictable nature of which components need replacing as well as the fact that virgin cores are in plentiful supply.

**Table 3 Remanufactured Cartridges that are remanufactured only once**

	2020
Toner	82%
Ink	89%



## Summary Findings

According to studies from 2007 to 2020, most remanufacturers only collect a small fraction of their own products. As of 2020, 80% of remanufactured toner cartridges sold will ultimately be thrown away because remanufacturers prefer to work with cartridges that have never been remanufactured before.

According to studies from 2007 to 2020, most remanufacturers only collect a small fraction of their own products. As of 2020, 87% of remanufactured ink cartridges sold will ultimately be thrown away because remanufacturers prefer to work with cartridges that have never been remanufactured before.

According to studies from 2007 to 2020, most remanufacturers only collect a small fraction of their own products. As of 2020, 85% of remanufactured cartridges sold will ultimately be thrown away because remanufacturers prefer to work with cartridges that have never been remanufactured before.

The table below provides for remanufactured and NBC Inks and toners the share of which ultimately will end up in landfills along with totals for each technology and types.

**Table 4 summary of remanufactured and NBC cartridges that end up in landfill**

2020	Reman	NBC	Total
Ink	87%	99%	89%
Toner	80%	96%	83%
Total	85%	98%	87%

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John Shane is a leading industry expert on marking materials such as toner, OPC, inkjet ink, and cartridges. As a Director for the Communication Supplies Consulting Service, Mr. Shane is responsible for all forecasts, research reports, consulting, and client care concerning those topics. He is a well-known authority on all-in-one toner cartridges, the cartridge recycling industry, and the world toner industry. In addition, he has conducted extensive research following similar trends related to inkjet cartridges, refills, and compatibles. Having consulted on these markets since 1988, Mr. Shane is a frequent expert presenter at industry conferences and trade events.

Prior to joining InfoTrends, Mr. Shane spent seven years at BIS Strategic Decisions, where he served as an Analyst as well as Director of the company's Hard Copy Supplies Service. He also served as a Consultant for International Data Corp. (IDC) and a Site Manager of a consumer research center within the U.S. Testing Company. Mr. Shane holds a B.A. Degree in Marketing and an M.B.A. Degree from the University of Massachusetts at Amherst.

This material is prepared specifically for clients of InfoTrends, Inc. The opinions expressed represent our interpretation and analysis of information generally available to the public or released by responsible individuals in the subject companies. We believe that the sources of information on which our material is based are reliable and we have applied our best professional judgment to the data obtained.

# Appendix - Table from WEU Cartridge Collections & Recycling Refresh 2020

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# Reman Summary

Ink						Toner						
2007	2011	2014	2016	2018	2020	2007	2011	2014	2016	2018	2020	
93%	92%	87%	88%	85%	87%	94%	91%	83%	81%	80%	80%	% of remanufactured cartridges sold which will ultimately be thrown away due to remanufacturer preference to work with cartridges that have never been remanufactured and lack of recycling for unusable cartridges and replaced parts
90%	90%	85%	87%	87%	89%	85%	82%	79%	80%	82%	82%	% of ink/toner cartridges that are remanufactured only one time
10%	10%	15%	13%	13%	11%	15%	18%	21%	20%	18%	18%	% of ink/toner cartridges that are remanufactured from non-virgin cores
39%	38%	27%	25%	25%	26%	16%	15%	18%	17%	18%	19%	% of ink/toner cartridges that remanufacturers collect (are not suitable for remanufacturing) that cannot be profitably remanufactured.
70% 0% 30%* 100%	35% 30% 35% 100%	15% 45% 40% 100%	16% 38% 46% 100%	13% 39% 48% 100%	10% 41% 49% 100%	50% 0% 50% 100%	40% 15% 45% 100%	20% 50% 30% 100%	13% 42% 45% 100%	10% 44% 46% 100%	10% 44% 46% 100%	% of unusable cartridges and components that go to the landfill % of unusable cartridges and components that are recycled to new products or raw material % of unusable cartridges and components that go to waste to energy
	60% 35% 5%	50% 42% 8%	45% 42% 13%	40% 45% 15%	35% 45% 20%		30% 30% 40%	23% 32% 45%	20% 34% 46%	15% 38% 47%	15% 35% 50%	Location of remanufacturing for cartridges destined for sale in the WE •WEU •CEU •Other/Asia/Africa
							%	%	%	%	%	To what extent are components replaced <u>Virgin</u> •OPC •Blades •PCR •Dev. Roller <u>Non-Virgin</u> OPC Blades PCR Dev. Roller
							95/50 90/50 35/80 20/80	95/65 90/65 35/90 20/90	90/60 85/60 35/90 20/90	90/65 80/60 30/85 15/85	90/65 80/60 30/85 15/85	

\* Landfill: Use of municipal waste. Municipal solid waste is commonly known as trash or garbage (US), refuse or rubbish (UK) is a type of waste consisting of everyday items that are discarded by the public. Depending on local laws, trash or rubbish may be buried untreated or may first be incinerated before the ashes are disposed of based on local laws.