

PRIMARY RESEARCH

US CARTRIDGE COLLECTION AND 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 built compatible ink and toner cartridges. InfoTrends interviewed 15 industry participants including remanufacturers and channel members to understand the current situation. 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 moulded 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.
- **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.

Key Findings

- Remans Situation
 - Clover is the single dominant US owned remanufacturer and has consolidated its position with the acquisition of the remaining assets of LMI.
 - Only ILG/Turbon remains as a (Large) remanufacture and much of their product is sourced
 - Medium and small remanufacturers continue to be squeezed out
 - Remanufacturers (Clover) face increased pressure from OEMs in MPS and the price pressure temptation from NBCs
 - They are in an at-risk situation as an industry. Note that other regions of the world have seen the domestic remanufactures nearly wiped out by NBCs.
- Research into remanufacturer collections and recycling activities is becoming more difficult every year
 - Consolidation in the domestic market means fewer large or medium remanufacturers to interview
 - Remans know that their lack of own-used collections is being used against them though they suspect that few OEMs get a large share of their own cartridges back either
- At this time the research found no significant NBC supplier that provides an end of life program for customers
 - NBC manufactures do not take back their empties
 - Remans do not want NBCs and attempt to avoid collecting them



- Asian made remans are gaining share.
 - US Reman respondents have little information on China based production activities
 - Remanufacturers in China are more willing to remanufacture non-virgins. They are also willing to remanufacture a non-US collected empty.
- Domestic remans remanufacturing of their own cartridges has slightly declined
 - Empty OEM cartridges are plentiful and inexpensive
 - Remanufacturing a non-virgin is focused on very old model cartridges, newest models and some high-class models
- Domestic remanufacturers own internal waste recycling ratio has increased due to consolidation

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.

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.

- NBC suppliers are reported do not take back their empties
- Neither NBC resellers nor remanufacturers are aware of any solid take back programs
 - One past exception was ProEarth/Tonerhead <http://proearthtoner.com/> but that URL is now a 404 error
 - A search finds no alternative site
- Many NBC vendors and resellers of NBC websites, if they mention recycling their own products, direct users to www.earth911.com which directs users to take empties to Staples, Office, depot, Etc.....
 - Recycling activities sponsored by Staples, Depot, Best Buy, etc. are not estimated because they are not measurable or sponsored by NBC producers



- All respondents expressed the belief that NBC returns to the above retailers is minimal. Most are thrown in the trash.
- Remans who accidentally collect NBC send waste through their usual process
- Domestic remans largely maintain that they do not reman NBCs
 - Remans will not reman an NBC because of IP fears as well as quality/reliability issues.
 - Emerging issues related to firmware lockouts also
- Remans state that empty NBCs are not a huge problem for collections
 - Most NBCs are purchased on the internet and those users are not typically where remans focus their collections efforts. Their collections are primarily done in cooperation with their own channel partners.
 - Some remans expressed concern that of NBCs may make more headway into the B-to-B. If so, the problem could increase. (LD Products mentioned several times)
 - That would be the least of their problems
 - They also state that B-to-B customers may require NBC take-backs in the future
- Some very small remans will reman NBC reluctantly
- Almost all collection of NBCs by remans (and OEMs) is unintended and accidental
- NBC cartridge manufacturers don't offer recycling programs because under their current pricing models, the added cost could be prohibitive

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 above provides our estimates on what the remanufacturing industry does with cartridges and components that they cannot use or sell.

- Domestic remans continue to make improvements in terms of the amount of product that is disposed in a landfill
 - Improvements have slowed vs prior years due to hollowing out of domestic reman industry. Fewer large and medium remans



- Large domestic remans already largely avoid landfill and the large domestics are consolidating the market
- Chinese remans still largely do not have a program to collect their own remans at all. Most do buy empties in the US for reman but not selective on their own cartridges
- China-based remanufacturers largely do not collect their own cartridges due to the quality trade-off driven by competitive pricing
- Collected waste is still a small proportion of all cartridges that go to landfill.
- Most landfilled cartridges are those that are never recollected
- Sustainability is a selling point in both regions

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

	2020
Laser	
Landfill	37%
Waste-to-Energy/ Incineration	11%
Recycled	52%
Total	100%
Inkjet	
Landfill	23%
Waste-to-Energy/ Incineration	14%
Recycled	63%
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 are previously remanufactured cartridge from a different remanufacturer, an NBC that will not collect 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 numbers had been higher as there is more remanufacturing on ink tanks now than in the past.

NBC's have been gaining share among 3rd party product however they are largely confined to the internet and users who buy that way. Remanufacturers do not collect empty cartridges backwards through the traditional sales channels such as contract stationers and MPS providers. As such the impact of empty NBCs in the market has been limited.

- There has been little change since 2018 of the probability that a collected virgin or non-virgin will be "Bad"
- Any changes would mainly come from the mix of virgin versus non-virgin and that mix has not changed enough to change these percent's in whole numbers
- Mix of bad Virgin vs Bad Non-Virgin driven by result of mix of overall use of virgin vs non-virgin + the success rate for each.
- 82% of Remanufactured toner and 90% of remanufactured ink cartridges are remanufactured only once
- 18% of remanufactured toner and 10% of remanufactured ink cartridges are remanufactured for a second time

Table 2: Unusable remanufactured cartridge collections

	2020
Laser	
Bad Virgins	8%
Bad Non-Virgins	4%
Subtotal	12%
Bad-Wrong Vendor	9%
Total	21%
Inkjet	
Bad Virgins	9%
Bad Non-Virgins	3%
Subtotal	12%



Bad-Wrong Vendor	20%
Total	32%

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	90%

Summary Findings

According to studies from 2007 to 2020, most remanufacturers only collect a small fraction of their own products. As of 2020, nearly 86% 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, 90% 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, nearly 88% 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
Toner	86%	100%	88%
Ink	90%	100%	93%
Total	88%	100%	91%

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