PPA Deinking and Recycling Guidelines for Magazines (July 2019)

Deinking and recycling

Magazines and inserts are a valuable feedstock for recycled paper mills, but some ways of printing, binding or adding special effects can make paper difficult or impossible to deink or recycle. The circular economy very much depends on all players within a value chain understanding their particular contribution to the cycle and thus their role in the success or otherwise of the circle. For the paper cycle, this involves cooperation between raw materials providers, machinery suppliers, designers, publishers, printers, finishers and recyclers, and this has been happening for some years now. This document highlights the critical issues and gives practical guidance on how publishers can help; it has been revised to reflect the progress that has been made and to include new information and issues.

It also summarises the treatments used for magazines or inserts that currently cause mills the greatest problems or have the potential to do so - some are only a problem if the items form a large proportion of the batch of paper for recycling, for example pallet loads of unused inserts.

Magazines and inserts in office or household recycling (and standard office documents printed with some of the methods below) are usually part of a mixed batch, and so are rarely a problem. It is bulk overs from printers or unsold magazines that can cause problems. If they can't be deinked, that doesn't mean they can't be used at all – making board doesn't require deinking grades and they can safely be diverted into that recycling stream - but you need to separate them out from other paper for recycling at the printer or mailing house. It does, however, mean a loss of valuable fibre from the magazines/newsprint recycling loop.

In the UK in particular, we rely heavily on recovered fibre as a raw material – the Confederation of Paper Industries gives a figure of around 80% of UK-made paper as utilising recovered paper, and also states that "The long-term sustainability of recovered paper and its circularity in the economy is reliant upon it being of high quality."

What are the main problems?

To make recycled printing paper, the fibres need to mushed in water and the ink plus any varnish, adhesives and so forth removed – normally a straightforward process. The problems are caused if the ink can't be removed cleanly, if there are sticky substances that remain in the pulp or if the fibres cannot be accessed. This can also increase process waste, to the detriment of the economics of the recycling loop.

Listed below are the main problem issues for the UK's recycled newsprint and magazine paper mills that publishers can help with (in no particular order). The next section of this document gives more detail.

- UV cured inks and varnishes
- Plastics – magazine wraps/polybags and laminates
- Some adhesives
- Certain types of covermount
- Certain digital and flexo inks

Why are they problems?

Deinking plants and recycled paper mills are vast, and few: within the UK, there are just two mills that specialise in deinking printed paper and manufacturing recycled papers for magazines and newspapers. Much of the paper used by these mills is collected from printers, publishers and magazine retailers/distributers: the paper for recycling is sorted after collection, and most of the suitable material collected in the UK goes to these two mills; a small amount goes to Germany.

There are other paper recyclers in the UK, but the papers they make are not those used by magazines and newspapers.

With the tonnage going through mills, operating speeds and efficiency need to be high.

Some of the issues listed above are problems because they prevent access to the paper fibres – sealed polywrap that doesn't break open during pulping, for example; others affect the quality of the final pulp, either visually or in its performance.

For the paper cycle to function effectively, products must be fit for purpose and economic to produce. For recycled paper, the deinking process must work for the bulk of papers going into the mix; however, changes in printing technology are changing the mix of types of print used on paper collected for recycling, which can create challenges. Currently, there are no automated sorting systems capable of identifying and separating out items according to how they were printed.

The following sections go into more detail.

What alternatives are there?

There are a number of different ways to improve the recyclability, and therefore sustainability, of your magazines. As these involve changes to process specifications, it involves working in partnership with your printers and mailing houses. For example, UV varnishes and adhesives can be substituted for coatings that are more easily removed; in some instances there may be trade-offs, which is why your printers' input is important.

Knowing how inserts supplied by your advertisers have been printed is important, allowing any large numbers of overs to be segregated if necessary to prevent risk to the deinked pulp.

The following paragraphs look at the main issues one by one.

In detail - printing

Digital printing is a rapidly changing and growing part of the printing industry, and a great deal of work is underway with equipment, ink and paper manufacturers as well as the paper recycling community to manage its development sustainably. The information below is therefore subject to change as progress is made.

Water-based inks

Water-based inks, whether flexo or inkjet, tend to dissolve into the water and stain all the pulp, this is known as 'the red sock syndrome' as it has the same effect as putting a red sock into the washing machine with all the whites. The main problem inks are water-based flexo and inks using water-soluble dyes and pigments. However, now more water-based inkjet inks using solid pigments with additional compounds can be deinked in using standard methods. This usually goes with better image quality, but is more expensive than the cheap dye-based inks.

Mills can usually manage with water-based flexo-printed materials if there is a very low percentage in the batch – not more than 3 – 5%. Items most likely to be printed water-based flexo are the insides of envelopes and some newspapers.

For magazines, water-based inkjet is used for labelling, addressing or numbering; coverage is so slight that it is not a magazines issue.

Other types of printed material are more of a concern: it takes as little as 2% of water-based inkjet in a batch of recovered paper to make the whole batch unusable for new paper, so be aware, this would be an issue in volume, for example for printing specialist inserts or marketing materials or, potentially, paper wraps.

What you can do about it

If your printer has a substantial number of supplied inserts over that have been printed using water-based inkjet, please ask them to:

- keep them on separate pallets for disposal
- advise the paper recycling contractor
- clearly label as being not suitable for deinking.

If you are considering using inkjet printing for inserts, marketing literature or your own publications, always ask your printers about the recyclability of printed material produced on the equipment they use and ask for evidence, such as manufacturer's test results (from INGEDE, for example).

ElectroInks (HP Indigo)

Indigo inks can't currently be removed by the standard deinking process used for recycling and leave dirt specks in the paper made from deinked pulp. Even a small proportion in the mix can cause an entire batch of pulp to be unusable as recycled graphic paper. INGEDE recommend that Indigo-printed materials are suitable only for corrugated board and should be kept separate from materials intended for deinking.

The deinking and recycling industry and HP have been working on the issue, but so far with limited success. In Paris in July 2018, COPACEL, FEDEREC, UNIIC and HP issued an information statement, "Recognizing the importance of the innovation represented by HP Indigo inks," and calling on printers to "implement separate collection of waste and scrap from HP Indigo technology prints so that their recycling can take place in a process where these prints do not disrupt deinking." The PPA recommendation from the first issue of this document therefore remains unchanged.

Indigo printing is used for a wide range of shorter-run products, so may have been used to print inserts for the magazine.

What you can do about it

If your printer has a substantial number of Indigo-printed inserts over ask them to:

- keep them on separate pallets for disposal
- advise the paper recycling contractor
- clearly label as not suitable for deinking.

UV printing

Magazines do not generally use UV-cured inks for the body of the magazine, but it is often used for covers and inserts. UV inks traditionally cause ink specks in the paper made from deinked pulp that can be seen by the naked eye. UV printing use is gradually increasing since the advent of LED-cured UV, and so is becoming more a concern in the paper stream for deinking.

A recently developed UV ink uses new technology to address this issue and has shown excellent deinking results; the ink is now commercially available.

What you can do about it

Avoid products using conventional UV-cured printing ink if possible: ask your printer if they can switch to using a deinkable UV ink.

If your printer has a substantial number of UV printed covers or inserts over that are printed with conventional UV ink, ask them to:

- keep them on separate pallets for disposal
- advise the paper recycling contractor
- clearly label as not suitable for deinking.

Other

Some plant seed oil-based inks, especially soybean oil, can also be difficult to remove as the soybean oil polymerises when drying, so ask your printer about the deinkability of their inks if they are using them.

In detail – varnishes and laminates

Laminating

Laminating one side of a sheet of paper with plastic laminating film adds to the amount of waste produced during the recycling process. Laminating both sides completely prevents the water reaching the paper, so that it can't be turned back into pulp and just becomes waste.

Increasing process waste from recycling plants in this way adds cost to recycling, loses valuable fibre and detracts from the sustainability of magazines. Plastic lamination also adds to the volumes of single-use plastics. Any form of lamination uses additional energy and resources during your own production process.

UV varnishes

UV varnishes create similar problems to UV inks, leaving coloured flecks in the paper made from the deinked pulp that cannot be removed.

What you can do about it

Ideally, avoid any varnishing to be more resource- and energy-efficient if possible.

If you are considering using a different type of varnish, ask your printer the following questions:

- what types of varnish they can offer
- ask for evidence of its deinkability
- ask for samples of previous work and check fitness for purpose in case there are issues you need to take into account when making your decision.
- The team that developed the deinkable UV ink are working on further products, so watch out for new developments in this area.

If your printer has a substantial number of UV-varnished covers or inserts over for any reason, ask them to:

- keep them on separate pallets for disposal
- advise the paper-recycling contractor
- clearly label as not suitable for deinking.

In detail – adhesives

Certain adhesives can cause problems in the recycling process. Some adhesives intended for removal by separation may dissolve or break down into such small particles that they remain in the pulp during the screening process. Some water-dispersible adhesives may initially disperse in the pulp, but then regain their sticky form during papermaking. Either can cause breaks or defects in the paper, and even damage the machines. There are agreed methods for testing adhesives to ensure they can be removed as planned. Water-soluble adhesives are not generally considered a problem (although they can be). The best adhesives for recycling are those that can easily be removed.

The use of pressure sensitive adhesives, which are generally difficult to disperse, is increasing and so resulting in more in the recycling stream; stickers or inserts on or in magazines is one of the main uses. A new pressure sensitive adhesive intended to overcome this has been recently introduced.

What you can do about it

Ask your printer to find out if the adhesives they use are easily removed during recycling, including adhesives used for stick-ons. The manufacturer should be able to provide this information. For information on test methods for this, see the printed paper criteria documents at http://www.eu-ecolabel.uk/ecolabel-criteria.php

In detail – other problems

Polybags

Polybags and plastic wrapping contribute to overall plastic waste, which is a serious environmental issue and one that consumers have become very aware of and concerned about, giving rise to pressure on publishers to change to perceived 'environmentally friendly' alternatives. However, if some form of wrapping is essential, it is important to avoid reacting to such concerns without proper research: the whole life cycle of alternatives needs to be considered. Some may have a larger overall environmental footprint, others may give rise to other unintended consequences: for instance, in the current systems degradable plastics can act as a contaminant both in the recycling stream and in the food waste stream. This equally applies to plastics certified as compostable, as many local authorities use anaerobic digestion rather than composting and plastics are screened out before they reach the plant.

Magazines still sealed inside polybags are not pulped during the process, instead they create what is called 'boil in the bag' – a polybag full of boiled magazine.

What you can do about it

PPA has researched technology to help with reducing some of the issues on polybags, such as adding a line of perforations along the bag during the bagging process. Lighter weights do help, but more work is needed to determine the balance between breaking open at the recycling plant but still providing the degree of protection needed. However, although ensuring that bags break open enables access to the fibre content of the magazine, it does not prevent other processing problems plastic can cause, such as bags getting caught up in the equipment, nor does it resolve the issue of adding to waste tonnages.

Recyclable plastic wrapping is available that can be recycled by consumers along with carrier bags at larger supermarkets, if local authorities do not provide kerbside collection. To support responsible disposal of plastic wrapping, an increasing number of PPA publisher members are part of the OPRL (On Pack Recycling) scheme, adopting this labelling system to signify whether the polywrap is recyclable or not and advise consumers on the most suitable disposal method for their plastic wrap.

There has been a lot of work developing paper wrapping systems, which may offer a good alternative, but there are still questions to be answered: what is the overall environmental footprint compared to plastic wrapping? What impact will they have in the paper for deinking stream?

Again, PPA have been researching this and the different types of plastic wrapping for some time; for the latest information check the sustainability section of the website.

Glitter

Glitter is used primarily for inserts, stick-ons or covermounts. Items with glitter on cannot be recycled. Most glitter is made of plastic.

What you can do about it
Avoid using glitter or covermounts containing glitter if possible.

If inserts supplied use glitter, please ask your printer, if they have a large number of overs, to separate them and label the pallet accordingly.

Covermounts

Covermounts and tip-ins within a magazine can also get into the recycling process. All covermounts contribute to waste tonnages and are an issue for deinking; certain items cause more problems than others by disrupting the process or causing contamination.

What you can do about it
Follow the PPA best practice guidelines for covermounts which are available at:
https://www.ppa.co.uk/resource/sustainability-resources-including-the-ppa-carbon-calculator

Questions to ask

It will help the magazine industry improve its sustainability if you talk to your printers and others in your supply chain to let them know you are concerned about recyclability and give them a copy of this briefing. Particular questions to consider are:

- What process is used to print and finish inserts supplied?
- Are inks, varnishes and adhesives used in production easily removable in the deinking process? Can your printer provide evidence of this from the manufacturer? (for example, test results)

- Is the polywrapping or bagging process used such that the enclosed unsolds will break open during the pulping process? What information can your printer or mailing house provide to support this?
- What mailing options can they offer? And what environmental information do they have about them?

Looking ahead

Deinking plants are designed to deink materials printed with the major printing processes – in other words, the bulk of magazines in circulation. The general mix of printed materials in Europe is around 95% offset and gravure, so the technology used is designed for that. Materials printed by different processes can't always be readily deinked by the same method, and the different types of printed material are indistinguishable from each other so cannot be removed by mechanical or hand sorting.

Research is being carried out into paper coatings, different deinking processes and different digital inks and printing processes that can be deinked alongside offset- and gravure-printed materials., as well as the new UV-cured inks noted above. In the meantime, to be awarded the EU Ecolabel printed materials have to be deinkable using the standard processes; the Austrian national label and the Blue Angel label for printed products have recyclability requirements; Nordic Swan includes recyclability of finished products within its criteria. In Germany there is a law requiring anything that endangers an existing recycling system to be labelled. This type of requirement for recyclability is likely to become more widespread within a circular economy.

These guidelines will be updated regularly to make sure they are applicable to the current publishing environment.