

Information sheet

Guidance and checklists for waste prevention in brewing and soft drinks manufacture

The British Beer and Pub Association (BBPA), the British Soft Drinks Association (BSDA) and WRAP worked in collaboration with Carlsberg (UK) and Britvic Soft Drinks to illustrate how drinks companies can reduce ingredient and product waste being sent to sewer or land injection - Project Shandy.

In addition to case studies from Carlsberg and Britvic, the project team have put together this short note to:

- Help drinks companies take action to reduce waste in the most effective way;
- Signpost to further, more detailed guidance; and
- Provide checklists of how to address the most common waste hotspots in drink manufacture.



Why should drinks companies take action on waste?

UK drinks manufacturers have made great strides in reducing waste and improving efficiencies over recent years. Measures to reduce the amount of waste produced have delivered cost savings, and the remaining production waste is now recycled more effectively. While much progress has been made, there are still significant opportunities to reduce waste further and increase profitability.

WRAP research has shown that production losses vary from 2% for alcoholic drinks to 7% for soft drinks. Average losses experienced are 1.8% set-up losses; 1.6% production losses; 1.4% run-down losses; and 2.0% product giveaway. Drinks manufacturers suffer a total loss of 539 million litres of product annually.

All drinks manufacturing operations will create some waste. While it is important to dispose of waste as high up the waste material hierarchy as possible, the most cost effective and environmentally effective option is waste prevention.



"The BBPA was pleased to be involved in Project Shandy. We hope that the Case Studies and Industry Guidance will help brewers and soft drink manufacturers reduce waste and increase profits."

*David Sheen - Director,
BBPA Environmental Ltd*

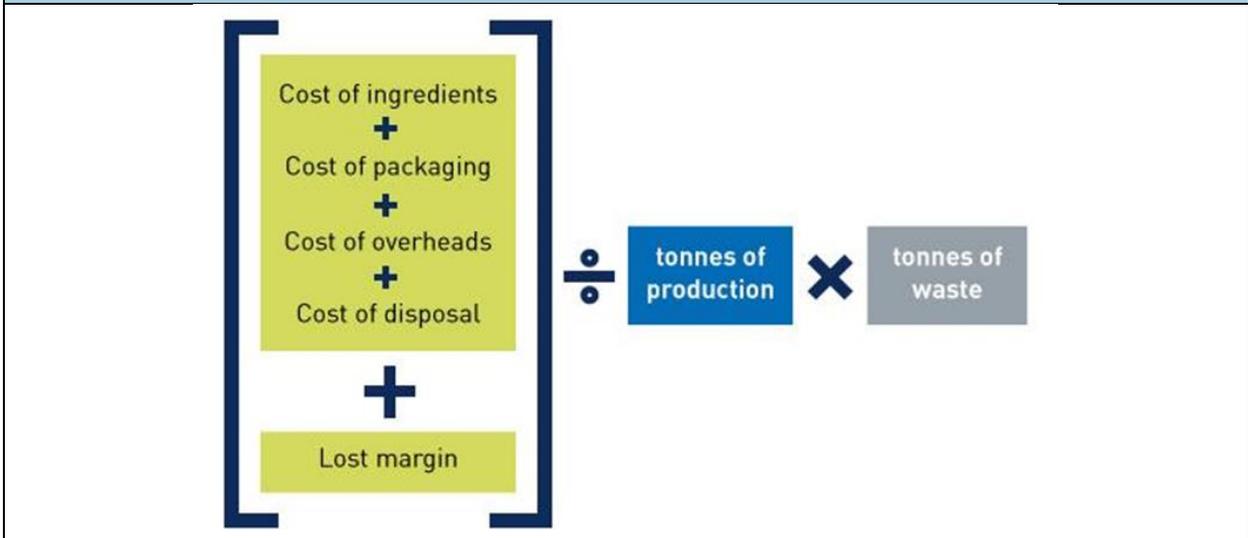
Key actions to reduce waste

Many drinks manufacturers have adopted the WRAP approach to waste reduction, taking five key actions to reduce the amount of waste generated.

- 1 Measure the waste** - many companies think they are measuring waste with Key Performance Indicators (KPIs) such as yield. Often yield is calculated after deduction of expected process losses, so companies don't have a real understanding of how much waste they are actually producing. KPIs should be based on total waste at every stage prior to delivery. Once the true amount of waste is understood, reasons for accepted losses can be challenged. For drinks manufacturing companies, it is likely that a key part of this measurement will be estimating ingredient and product losses to sewer in effluent.
- 2 Calculate the true cost of waste at each point of loss** - Cost calculations used by companies rarely provide the true cost of the waste. The true cost of waste is the value of ingredients PLUS added value in terms of labour, packaging, energy, water, overheads, PLUS the cost of disposal (including effluent treatment and disposal costs) and lost profit. It is important that the loss includes not only the ingredient loss, but added value at the point of loss. Knowing the true cost of waste allows calculation of accurate cost benefit analyses for proposed waste prevention measures, such as investment in new, more efficient, equipment. WRAP recommends a [true cost of waste calculation formula](#) and has tools to help.

True Cost of Waste

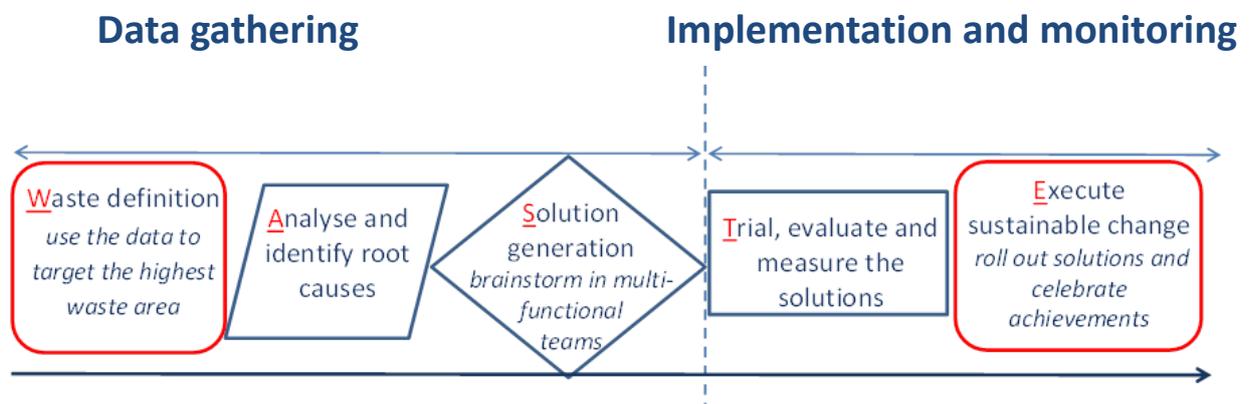
- Always measure actual losses - not deviations from expected losses. Expected losses should not be accepted losses.
- Calculate the true cost of waste at each point of loss. The basic formula to calculate this is shown below.



Key actions to reduce waste

- 3 **Set a target for waste reduction** - challenge accepted waste levels. Ensure KPIs encourage the correct behaviour.
- 4 **Take action on your top losses** – use WRAP’s straight forward problem solving approach, [W.A.S.T.E.](#), based on ‘lean’ principles to help you target waste in your business.
- 5 **Embed a culture of waste minimisation** - senior management need to lead this. Are they convinced about the [business case](#)? Develop and implement a policy on waste reduction. Engage employees on waste reduction. (WRAP is currently producing a toolkit for companies to use.)

W.A.S.T.E. - WRAP’s problem-solving discipline



Resources for drinks companies

For more detailed information and tools, see the [Manufacturing & Retailing pages of the WRAP website](#) as well as the following resources:

WRAP Guidance

- [Drinks Resource Maps](#)
- [Knowledge Base](#): The Knowledge Base includes an extensive library of data looking at the environmental impact hotspots associated with grocery products throughout their life cycle. The top 51 products have been researched and include: Beer, Carbonates, Cider and Perry, Dilutables, Juices, Spirits, and Wine
- [Clean-in-Place Guidance for the drinks sector](#)
- [Secondary Packaging Benchmarking across the Grocery Sector](#)

WRAP Case Studies

- [Carlsberg \(UK\)](#) reduced product loss to effluent by 475 tonnes and save £175,000 a year.



- [Britvic Soft Drinks](#) are due to save 156 tonnes of syrup from effluent a year (780m³ waste product equivalent) and achieve annual savings of £117,000.



Other resources

- [Soft drinks roadmap](#)

Checklist of waste prevention measures in drinks manufacture

WRAP, together with the BBPA and BSDA, have prepared a checklist of useful waste prevention measures proven to reduce waste and increase profitability. We hope that the measures are already standard practice in your company, but there may be some new ideas that are worth evaluating. Use the true cost of waste formula in cost benefit analyses to calculate a realistic payback.

The checklist includes potential improvements in:

- [General considerations](#)
- [Ingredients](#)
- [Preparation](#)
- [Cleaning](#)
- [Filling & Sealing](#)
- [Conveying](#)
- [Packaging](#)
- [Palletising](#)
- [Pallet Displays](#)



General Considerations

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Establish a waste prevention programme, for example, using the WRAP W.A.S.T.E. methodology .				
Collaborate with customers and suppliers on waste reduction investigations to achieve the biggest savings.				
Ensure all waste prevention measures are part of Standard Operating Procedures (SOPs). Ensure all SOPs are up to date, operators trained, and systems in place to ensure they are followed.				
Use standard optimised settings for all equipment. Eliminate the practice of each shift implementing their favourite settings; they can't all be right!				
Schedule long production runs where possible to reduce changeover / cleaning losses, but be careful to balance this and not to produce excess stock that must be later destroyed when product life is exceeded.				
Actions – Waste Diversion				
Redistribute drinks that are not suitable for sale through mainstream retail channels, but are fit for human consumption via commercial organisations or local or national charities. Such organisations will generally not accept alcohol, with some exceptions such as Company Shop .				

Ingredients

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Fully empty containers during discharge. e.g. in tomato juice preparation there can be as much as 5kg tomato paste residue in each 200 litre bag (2.5% loss).				
Practice good ingredient management: <ul style="list-style-type: none"> ■ Use good stock rotation to ensure first-in, first out. ■ Develop a system to warn production planners of ingredients nearing end of product life. 				
Standardise or minimise the number of ingredients during recipe development to reduce ingredient stock and potential redundant ingredients in the event of reformulation or delisting.				
Clear unwanted ingredients from old recipes in a timely fashion: it's cheaper to sell at a loss than pay for storage then disposal.				
Action – Optimising food and by-product use				
Sell malt contaminated with stones for poultry feed.				
Mix spent hops with spent grain to make them palatable to animals, and sell for animal feed.				
Send recovered yeast for reuse as animal feed, baking or the manufacture of yeast extract spreads.				
Supply sugar for reuse by bee keepers.				
Send used Kieselguhr (used in the brewing process) for reuse in the manufacture of cement.				
Send sugar solutions or syrups for reuse in the manufacture of bricks.				
Actions – Waste Management				
Dispose of waste beer, wine, or syrups as feedstock for anaerobic digestion, where these can't be redistributed or used in animal feed.				

Ingredient Packaging

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Work with your suppliers to reduce the amount of packaging waste through bulk supplies. See examples below.				
Ensure pack size is related to batch recipe to avoid waste: such as using part of a drum of defrosted fruit concentrate.				
Review requirements of secondary and tertiary packaging on all incoming goods: stretch wrap, dividers, corner posts, layer pads. Are there opportunities for the supplier to optimise the design, collect and reuse, or replace with reusable transit systems?*				
Actions – Waste Management				
Request non-perforated drums. Some fruit concentrate drums are supplied with perforated bases, so must be recycled and cannot be reused.				

*Note that some of these interventions prevent waste further along the supply chain

Examples of bulk packaging:

Sugar Packaging	Labour cost	Packaging weight per pack	Packaging weight per tonne sugar	Disposal
Bulk into silo	Nil	Nil	Nil	n/a
One tonne *FIBC	Low	3kg (typical)	3kg	Reused for non-food applications
25kg paper sacks	High	125g (typical)	5kg	Recycled

*Flexible Intermediate Bulk Container

Wine may be imported in bulk and bottled locally. See WRAP publication [Bulk wine importation](#).

Some fruit juice concentrates may be supplied in 25 tonne tankers.

Preparation

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Minimise the amount of material rejected when sorting natural ingredients. When a foreign body is detected, how much good product is rejected? Could this be reduced? A fast action flow diversion may halve the amount of waste.				
Minimise waste materials from mass flow detection of natural ingredients with a fine detection and recovery system. Re-test rejected material with flow at fine trickle to detect and reject contamination, and return good material to the process (prior to mass flow detection).				
Minimise pipe length from mixing to filling to reduce the amount of waste product at the end of production and cleaning.				
Use gravity to aid waste reduction by putting mixing operations at higher level than filling. Self-draining minimises syrup residue in pipes at the end of production.				
Use a pigging system to recover product from pipework and minimise changeover interface losses. Options include single pigging, double pigging and air vortex. 99% product recovery is possible.				
Actions – Waste Management				
Collect syrup waste (e.g. changeover interface) for separate disposal from liquid effluent to drain to significantly reduce effluent charges.				

Cleaning

Actions – Resource Efficiency	Not applicable	Already in place	Investigate	Complete
Design tanks and pipework to minimise Cleaning-in-place (CIP) required: avoid dead spaces, incorrect “T” junctions and air locks.				
Avoid “difficult to clean” RJT (Ring Joint Type) fittings.				
Use automated CIP with a predetermined minimum cleaning cycle to avoid overuse of water, energy and cleaning chemicals. Avoid “left to clean while on break” syndrome.				
Use a system to monitor the use of caustic during cleaning, in order to achieve savings in caustic and in the sulphuric acid used to neutralise prior to effluent discharge.				
Install accurate sensors to detect when syrup tanks are completely empty before cleaning. As much as 50kg product may be left in a tank.				

See WRAP’s [Guide on Clean-in-Place in the drink industry](#).



Filling & Sealing

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Ensure filler is well-designed to minimise product loss by fobbing (over foaming of beer at filler)				
Aseptic lines should incorporate pasteuriser hibernation, and an aseptic balance tank sufficiently large to hold a production batch. This prevents disposal of wasted product in the event of a long breakdown.				
Actions – Resource Efficiency				
Recirculate water used to pre-heat bottles used for hot filling. (Saving energy and water)				

Filling & Sealing - Canning

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Ensure there is a smooth transfer of cans from filler to seamer to minimise product loss caused by spillage.				
Practice regular maintenance of filler heads to avoid overfilling. Overfilled cans may not be evident if excess product is lost during seaming and thus not detected by the level detector.				
Ensure under-cover gassing is set correctly. A high flow rate can blow product from can, resulting in under-fills and increased effluent, and wasted CO ₂ .				
Actions – Resource Efficiency				
Save water by ensuring that empty cans are rinsed only when the line is running.				

Filling & Sealing - Bottling

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Where bottles are inflated with nitrogen, keep the injection point as close to capping as possible to reduce the amount required and the number of reject bottles when the line stops.				
Ensure glass bottles are acclimatised in temperature before being used in production. Condensation, greater breakage and handling problems can occur when conveying very cold bottles.				
Reduce water consumption by replacing water rinsing with air cleaning.				
Actions – Resource Efficiency				
Minimise the amount of water used to clean the neck after capping: a fine high pressure spray is more effective than a sprinkler pipe.				

Filling & Sealing - Level Detection

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Fit level detector that provides information about the performance of each filling head as this allows easy maintenance and reduction of overfills/underfills.				
Do level detectors automatically dump all filled containers if several underfills are detected? If so, disable.				



Conveying

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Ensure there is good conveyor control to prevent high pressure on containers and minimise breakages, fallen containers and container lift.				
Avoid conveyor gradients as containers are more susceptible to falling over.				
Install catch points to collect fallen containers without damage so they can be returned to the line.				
Provide adequate buffers in the production line to minimise the number of stops on the filler. Overfills and underfills most often occur during filler starts and stops.				
Plan changeovers to minimise the number of empty printed cans wasted at the end of a production run. Ideally empty cans should run out at the same time as product in the filler bowl. There is often potential to save several hundred cans per changeover.				
Install 'fishing rods' on the canning and bottling lines to guide the can/bottle into the track feeding the filler.				
Actions – Resource Efficiency				
Use dry lubrication of conveyor surface in preference to water spray systems.				

Packaging

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
See WRAP's benchmark report on Secondary Packaging to see the potential savings possible through moving to best-in-class packaging for drinks.				
Minimise printed packaging stocks to avoid excess waste when redesigned or delisted. Resist the temptation to order large print runs to reduce cost unless you are sure that it can all be used. Agree a suitable notice period with the retailer to allow remaining packaging stock to be used.				
Investigate returnable transit packaging for packaging components: e.g. reusable boxes for caps; (polypropylene) layer pads for cans.				
Optimise packaging materials specified. See WRAP's guidance on the ' Performance Packaging Specification ' method .				

Packaging - Shrink and stretch wrap use

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Minimise overlap at base; up to 5% saving possible*.				
Consider replacing trays with base pads*.				
Consider eliminating trays (best suited to up to six bottles/cans per case, and more for brick packaging)*.				
Investigate automatic splicing and changeover of reels to minimise waste film left on reels and the difficulty of recycling reel cores.				
Consider stretch-wrapped cases as an alternative as this can achieve better pack design clarity and save up to 50% film. Best suited to high volume applications*.				

*Note that some of these interventions prevent waste further along the supply chain



Packaging - Cartons and collations

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Ensure blank cartons are acclimatised to the factory environment before use. Cartons are sensitive to humidity and may be difficult to erect, with increased production stoppages and increased carton waste.				
Ensure good stock rotation of blank cartons. Cartons older than about six months do not perform as well: they may be difficult to erect, with increased production stoppages, and increased carton waste.				

Packaging – Labelling

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Print production codes directly onto carton (or tray) to replace self-adhesive labels.				
Ensure labels are correct size for the information required and are not too large.				
Print labels on line: up to 20% of pre-printed labels may be wasted.				
Consider liner-less labels to avoid waste silicone-coated backing.				
Replace thermal printing with ink-jet to eliminate used ribbon and cartridges.				
Actions – Waste Management				
Replace silicone-coated backing paper with clear PET film to improve recyclability.				



Palletising

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Use pre-stretched stretch wrap, especially for manually wrapped pallets to achieve up to 50% material savings.				
Ensure automatic stretch-wrapping equipment is configured to use the minimum amount of material required for expected transit conditions.*				
Actions – Resource Efficiency				
Optimise efficient stacking patterns of cases on each layer of pallet to reduce transit and warehouse costs.				

*Note that some of these interventions prevent waste further along the supply chain

Pallet displays

Actions – Waste Prevention	Not applicable	Already in place	Investigate	Complete
Avoid unnecessary secondary packaging* by configuring production so that bottles are packed directly as pallet displays (required by retailers) rather than packing in standard production trays and these having to be broken down and repacked at depots.				

*Note that some of these interventions prevent waste further along the supply chain

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