

All abattoirs and cutting plants must comply with meat hygiene standards in accordance with legislation under 853/2004, which necessitates the use of large quantities of potable water, for almost all washing and cleaning operations. Although these requirements limit the extent to which water usage can be reduced, increasing costs and government initiatives mean that companies are challenged to reduce consumption.

However, survey work has shown that many companies only monitored their water use by total cost over a period (monthly, quarterly and annually). Very few have sub-metering at point of use.

**The Emerging Requirements on the Industry**

The Federation House Commitment (FHC) is a voluntary agreement under which signatories contribute to a food and drink industry target to reduce its water usage by 20% by 2020 against a 2007 baseline. WRAP is responsible for working with signatories to achieve the target and extend the coverage within the food and drink sector. Currently, while the FHC potentially covers the fresh red meat sector, only two large integrated meat companies are signatories.

**Water Usage**

Meat processing is not a heavy user of water compared with dairy or the drinks industries. According to the Environment Agency (EA) water consumption and the subsequent related effluent from meat slaughtering and processing have a significant environmental impact. Consequently, the EA has tightened effluent management policies. Water is used for watering and washing livestock, rinsing the carcasses, and regular cleaning of the lairage, process equipment and work areas. Containment of infectious diseases is also extremely important to the industry, and transport vehicles are washed upon site entry and exit. In many plants water consumption has increased in recent years, as a result of increased processing activity (e.g. recovering more fifth quarter materials) and the adoption of new practices (e.g. replacing boxes with re-usable plastic trays that need cleaning).

As a rough guide, water consumption in any meat factory is dependent upon the amount of floor area used (including lairage and yards), as well as the management practices, such as:

- The rapid response to fixing leaks

- Washdown procedures of all production areas (lairage, production floors, blood pits etc)
- Gut room processing and management
  - Stomach emptying, washing and tripe polishing
  - Runner processing (runners are the intestines of sheep which when processed become sausage casings)
  - Hoof wash
- Carcase dressing systems automation
- Lorry washing controls
- Effluent management and water recycling
- Personnel wash stations
- Cutting and retail packing plant equipment e.g:
  - Packing machines
  - Tenderising processes and marinades
  - Tray washes and clean in place systems



*Water flowing even when operator has finished washing*

Hygiene requirements also prohibit the use of high pressure low volume (HPLV) sprays in meat areas during processing operations as the atomised water can lead to airborne contamination, although they can be used for cleaning at the end of production.

Survey information showed that on average about 4.2m<sup>3</sup> of water is used to produce a tonne of beef or sheep meat from slaughtering, cutting and retail packing. The actual water use variability was high, varying from about 2.6 to 7.5m<sup>3</sup> per tonne, depending on the type of processes within the plant and whether it was a single species or multi-species plant. On a per animal basis, the water used in the slaughtering process for cattle averaged 465 litres and for sheep, 51 litres.

### Managing Water Usage

Water losses and costs of leaking taps, running hoses and toilets. The costs are calculated on a cost of £1 per m<sup>3</sup> of fresh water into the business and £2 per m<sup>3</sup> for effluent. Total cost per m<sup>3</sup> equals £3 per m<sup>3</sup>

Type and Condition	Loss l/h	Loss m <sup>3</sup> /yr	£ lost per annum (at a cost of £3/m <sup>3</sup> )
<b>Leaking Tap</b>			
10 drops per minute	0.7	6.1	18.30
30 drops per minute	2.1	18.4	55.20
1mm run	9.0	79	237.00
1.5mm run	18.0	158	474.00
<b>Water hose running fully open (250 days at 8 hours)</b>			
½ inch (12.7mm)	3,000	6,000	£18,000
¾ inch (19mm)	5,100	10,000	£30,000
<b>Toilet</b>			
Running so it can be seen with careful observation		99	£297
Running and can be clearly seen		195	£585
Unrest on surface		495	£1,485
Pouring		3,000	£9,000

Source: Envirowise

The first stage in managing and improving water use is to implement an environmental management system (EMS), such as adopting ISO 14001. See factsheet 1 for what is involved with an EMS.

Many plants have found that measuring and monitoring their water usage and discharge, even without an EMS, allows them to get a picture of what is happening and implement better management practices that will reduce water consumption. When local sub-meters are fitted and consumption reduced, big savings can be realised.

#### General site maintenance

- Understand the water distribution system in the plant – survey work has shown that many plants did not have an accurate water distribution plan for their buildings



Pipework with no labelling or arrows denoting direction of flow

- Fix the drips and leaks – A drip at home is noticed; in the abattoir or processing plant, a free running nozzle is often overlooked. Water intake and discharge from the plant should be checked weekly. Leak reporting and repair should be a part of routine maintenance



A free flowing barrel

- Install a waste water discharge meter – which will help locate leaks and other sources of wasted water. It has been estimated that one leaking tap (30 drops per minute) can account for over 18m<sup>3</sup>/yr of water loss a year (which at £3/m<sup>3</sup> = over £55 a year)

**General site maintenance** (cont'd)

- Check water pressure – hot and cold water pressure should be checked regularly
- Install water restriction devices on items such as taps, showers and toilets.
- Fit low volume high pressure nozzles on all hoses and restrict hose use
- Carcase wash – The practice of using a hose to remove visual contamination from the carcase or washing the carcase prior to the chillers is no longer recommended
- Hand and apron washes – The amount of water used for hand and apron washing is controlled by the operator but the controls need to be checked so that they are working efficiently
- For equipment sterilisers, choose an insulated design that uses the least water but provides hygienic sterilisation; check that they are working efficiently
- Machine and tray washes – install systems that use recycled water for part of the process and have automatic cut offs when no trays are present
- Staff training and management – washing processes (especially when contract cleaners are involved) need to be monitored and optimised to achieve cleanliness and hygiene. Explain the costs to employees so they understand the implications. Train them to use dry cleaning techniques first; preclean process areas by brushing and collecting waste, emptying drain traps before washing, and turning off hoses. Train them to reduce water use and effluent loading by explaining the costs of wasting water and washing meat waste and fat down the drains
- Ensure they have the proper dry clean equipment (squeegees, scrapers, brushes, wet/dry vacs) to collect floor droppings, including large pieces of meat
- Establish area specific usage information
- Fit low volume high pressure nozzles on all hoses and restrict hose use. Ensure hoses are fitted with release grips and these are not tied down. Select the smallest nozzle size without compromising function. *(These days some abattoirs are moving to foot switches to minimise repetitive strain injury [RSI])*
- A properly adjusted gooseneck should deliver about 3 litres of water per minute. However, it is common to see the nozzle removed from these hoses and the flow at 10 litres per minute.
- Discourage the practice of removing or drilling hose nozzles to allow more water flow and always ensure that none of your hoses are left running clean water into the floor drain



Hose with quick release nozzle

**The Cleaning Regime**

- Cleaning procedures – produce procedures and systems that increase cleaning efficiency. Map water use on site and reuse water for dirty rinses (e.g. first wash down water can be used to clean manure from floors). Reuse relatively clean waste water, (cooling systems, slaughter floor, carcase washing, etc) for non-critical washing



Brushes, squeegees and access ladders neatly stored

**The Cleaning Regime** (cont'd)

- Lorry wash – Vehicle washing accounts for up to 5% of total water used at red meat abattoirs. Sites should ensure that washing processes are optimised (even through the use of metered water dispensers) and, where appropriate, wash water can be treated and recycled. Abattoirs should try and ensure that the lorries are dry cleaned before water is used
- Lairage – a dirty lairage with more soiled bedding will need more water for cleaning, which will produce more effluent – therefore encourage producers not to feed livestock for 12 hours prior to slaughter
- Gut room – review the usage. Gutrooms are potentially high volume use area and can use more than 200 litres per minute. Do not use water to transfer stomach contents out of the gutroom. Investigate the methods used to rough wash guts
- Tripe processing – a facility to clean and polish tripe uses two washes and these can use significant quantities of hot water – review usage, especially cycle times which in practice are often longer than manufacturers specification (this can be due to poor

maintenance). Ensure that flow control valves are working efficiently, look into reusing the water from the second wash for the first

**Rainwater Harvesting**

Significant water supply can be gathered from rainwater harvested from roofs on site. Underground or above ground tanks can be used for storage. Rainwater can be used to clean lorries, yards, lairage and flush loos. A standard charge is added to effluent bills for it to go down the drains. Try to prevent it going down effluent drains and reuse where possible.

**IMPORTANT NOTE: systems need to be put into place to prevent an inexperienced operator connecting to the ‘grey’ water to wash a food area.**

**Recycling Water Options**

Reuse relatively clean wastewater (e.g. from steriliser and hand wash, cooling systems, slaughter floor, carcase washing, etc) for non-critical washing.

**Examples of key performance indicators KPIs used to manage water usage**

KPIs	Units	What is it?	What does it reflect
Total water consumption	Total m <sup>3</sup> consumed	Total water use on site (excluding cooling water)	Total volume of water consumed in any given time period
Process water	m <sup>3</sup> /tonne of product	Water used in processing operations e.g. slaughterhall, cutting plant, retail packing	Volume of water used in a given time period to produce a kilogramme of meat (beef, lamb or pork) of production. Few mixed abattoirs were able to split water consumption by species
Cleaning water	Total m <sup>3</sup> consumed	Water used for cleaning purposes	Volume of water used for cleaning (which could be broken down by different operations)
Cooling water	Total m <sup>3</sup> consumed	Water used as a coolant	Water used in packing machines (shrink wrap), cooling tripe
Water sub-metered	m <sup>3</sup>		Suggested areas could be lorry wash, tripery, gut room
Water reused/ recycled	% by volume	Proportion of water recycled on site	Level of water reuse/recycling being achieved