

APPENDIX 3: Cooling System

Cooling systems have the same basic principles as heating systems. The air in the space is being temperature controlled to have a different temperature to the air outside the space. This means that draught proofing still plays a vitally important role in ensuring that the system can work efficiently.



BUILDING COOLING

Buildings can be kept cool through a number of systems which can be mechanical or passive. If there are large gaps under doors or around windows, hot air from the outside will come in, which will make the cooling unit work harder to keep the building cool.

- Consider installing sensors to windows and radiators to ensure that the cooling air conditioning is switched off should any windows be opened. This will reduce unnecessary power consumption and 'fighting' of the systems.
- Consider commissioning an Air Conditioning Energy Assessment on the AC system, to ensure that it is running as efficiently as possible.
- Ensure the condensing unit is located away from any other units that may affect its performance.
- Ensure that the refrigerant R22 is not in use ¹.
- At the end of the air conditioning systems life, consider installing either a high efficiency or heatpump and remote condenser, selected from the ECA list. The ECA list provides 100 % first-year Enhanced Capital Allowances (ECA). This allows the full cost of an investment in designated energy-saving plant and machinery to be written off against the taxable profits of the period in which the investment is made. Visit www.eca.gov.uk
- If cooling has a capacity of 12kW or more, a TM44 inspection will be required ².

AIR CONDITIONING

AC systems are often used to cool buildings in hot places, but it can also be used to heat buildings. These systems are often found in offices and other large buildings in this country. It is important to ensure that an appropriate refrigerant is being used. The refrigerant R22 is now illegal, and should be removed.

Whether being used for heating or cooling, it is important to operate the air conditioning system efficiently. This includes ensuring that it is set to an appropriate temperature, and ensuring that the room that is being temperature controlled is well sealed. Air conditioning systems provide ventilation, so it is never appropriate to have a window open while the AC is operating.

¹ www.archive.defra.gov.uk

² [BRE - The facts of air conditioning inspections](#)



PASSIVE COOLING

Technologies such as chilled beams can provide low carbon cooling for a building. These methods do not always incorporate ventilation. As with mechanical ventilation and cooling systems, it is possible to combine passive ventilation and cooling, normally through pre-construction design.

Water is often employed in passive cooling systems. This is because it is possible to extract a lot of heat energy from the air by evaporating water, and extracting the resulting steam. Systems that employ this method are usually added during initial design stages, and are most effective in hot countries.

Chilled beams offer a retrofit alternative. These beams hang just below the ceiling, much like a light fitting, and cold water passes through them in pipe work. The beams then act as a heat exchanger, cooling the air around them. This cold air sinks, allowing warm air to rise, creating convection currents in the room. This method can also be used with hot water as a heating method.

FOOD AND DRINK REFRIGERATION

Refrigerators use a lot of electricity. It is therefore important that measures are taken to ensure that they are maintained and run efficiently. This includes ensuring that they are at the correct temperature, and that their seals are intact.

It is also beneficial to keep the fridge or freezer far away from any hot equipment such as an oven or grill. Technology such as the eCube could be installed to improve the efficiency of your fridge. For more information on efficient refrigeration, please read Appendix 9 – Kitchens.

COOLTUBE

Beer is traditionally kept cool in beer cellars, which should be kept at 12-14°C, and piped to the bar. This method keeps all of the beer cool at once, even though some will not be drunk for a long time after it is first stored, and beer does not need to be kept cool for preservation. As the Department for Environment,

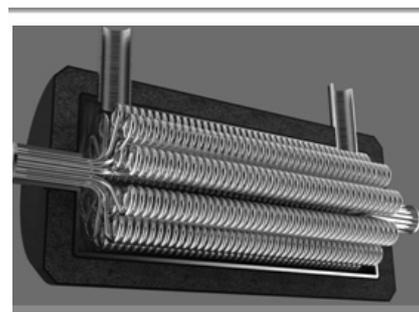
Food and Rural Affairs (DEFRA) inform: www.defra.gov.uk/news/2012/07/08/food-innovation/ Pubs or bars will be able to save almost £3,000 a year, serve better pints to punters, and conserve significant amounts of energy using state of the art drinks cooling technology being developed with Government backing.

Instead of beer being cooled in the cellar, warming in pipes on its way to the bar and being cooled again just before serving, the system will use far less energy. Drinks will be chilled as they're needed which will mean better drinks, served at optimum temperatures, with less wastage.

WHAT IS COOLTUBE?

The CoolTube is constructed from stainless steel throughout and is over six times smaller and lighter than a standard remote cooling pod and has a superior delta T (ΔT) in comparison to competitive products. The product is so compact and lightweight that it doesn't require fixings, therefore can fit in most confined spaces including directly under the font, saving valuable space behind the bar.

It has over 4 times more cooling surface area per ml of product than a standard pod and holds less than 80% of the amount of coolant.



Cooltube



For example, the surface area cooling of the beer coils in the CoolTube is 24cm² per ml of beer. This compares to other heat exchanger products which have less than 6cm² per ml of beer surface area cooling.

Dispensed drinks temperatures can be within 1°C to 2°C of the python recirculation temperature. There is very little variation in dispensed temperatures whether or not a half pint is poured or the tap is constantly opened. This is due to the low volume actually within the CoolTube and its unique heat exchange technology.

CoolTube is easy to install and delivers outstanding results so as a time and space saving device it's second to none. The product is compatible with all standard industry push in fittings and comes in two standard sizes. Brewfitt is happy to manufacture bespoke, made to measure CoolTubes as required. The technology can also be adapted into the dispense font/tower. All stainless steel components are made from high quality grade 316.

KEY BENEFITS:

- Over 6 times smaller and lighter than standard heat exchangers.
- Has a superior temperature range in comparison to other products.
- Has the equivalent of 18 meters of product coil.
- So compact and lightweight that it doesn't need fixing into position.
- Fits into the most confined spaces including directly under the font, saving valuable space behind the bar.
- Has over 4 times more cooling surface area per ml of product than a standard heat exchanger.
- Holds up to 80% less coolant than other products.
- Dispensed drinks temperatures can be within 1°C to 2°C of the python recirculation temperature.
- Consistent dispensed temperatures due to the low volume of product within the CoolTube and its unique heat exchange technology. Thus removing any dwell pint issues.
- Scope to include the technology inside the point of dispense.

[See how the explained system works.](#)

INNENERGY³

A simple 'plug and play' device was identified on the market which could achieve substantial cost savings. RFU conducted a trial of a device called InnEnergy[®] which has the potential to save 40% of the energy use from drink chillers, where operation levels are high.

Four test clubs took part in the trial, achieving an average saving of 17% on chiller electricity consumption. Three out of the four participating clubs trialled the device on two of their chillers. For this level of use, and with a device cost of £59.95 the investment will pay back in 9.5 months and over its lifetime will provide a significant cost and carbon saving to the clubs. Clubs with higher levels of bar activity will achieve even greater savings.

How does it work?

This is a very simple device which works by self-optimising the times that chiller(s) are on and off in-line with bar operating hours. It is easy to use and programmable to exact club opening times, 24 hours a day 7 days a week.



³ Sustainable Clubs



The device also ensures that cold drinks are ready to serve at opening time and refreshes pythons regularly to maintain quality. It is currently used by major pub chains including Punch Taverns and Whitbread.

The Trial

An independent trial of the device was conducted in spring 2011. Data was collected from the four Rugby Clubs via an Efergy Energy Monitor, and electricity meter readings were recorded. The savings calculated ranged from 11-30% (depending on the level of activity at each club). Cost savings of £150/yr were identified, with annual CO₂ savings of approximately 3/4 tonne per club per year. Across the 1,200 largest RFU clubs this amounts to savings of £135,900 and over 840 tonnes CO₂/yr. Assuming a conservative ten year lifetime for the device, this would result in a total saving of 8,400 tCO₂.

Where can I get one?

Clubs can purchase this type of device online. It is installed simply by plugging an existing chiller into the device and then into the plug socket previously used. After one week of 'learning' about existing consumption, the device starts to optimise chiller use, turning off the chiller when it is unused. The device can also be pre-programmed with exact club opening times.

