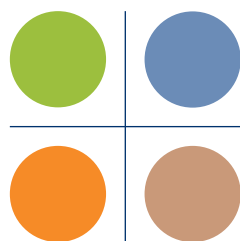


For all staff responsible for energy efficient design, purchasing and working practices in commercial kitchens

RECIPES FOR

- Kitchen design
- Fridges and freezers
- Dishwashers
- Cooking
- Ventilation
- Lighting



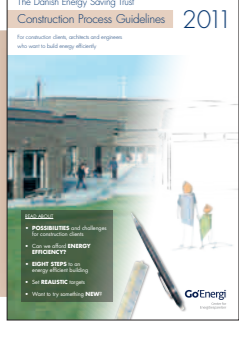
Guidelines from the Danish Energy Saving Trust



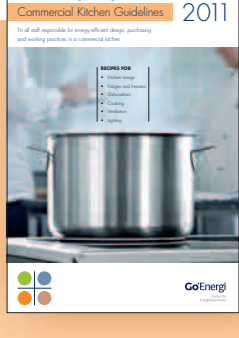
- PURCHASING**
- Leaders and senior management
 - Staff responsible for purchasing
 - Staff responsible for energy
 - Purchasers, technicians and operations and maintenance staff



- INTERIOR DESIGN***
- Constuction clients
 - Staff responsible for buildings and operations and maintenance
 - Staff responsible for energy
 - Architects, engineers and developers



- CONSTRUCTION PROCESS**
- Constuction clients
 - Architects and engineers

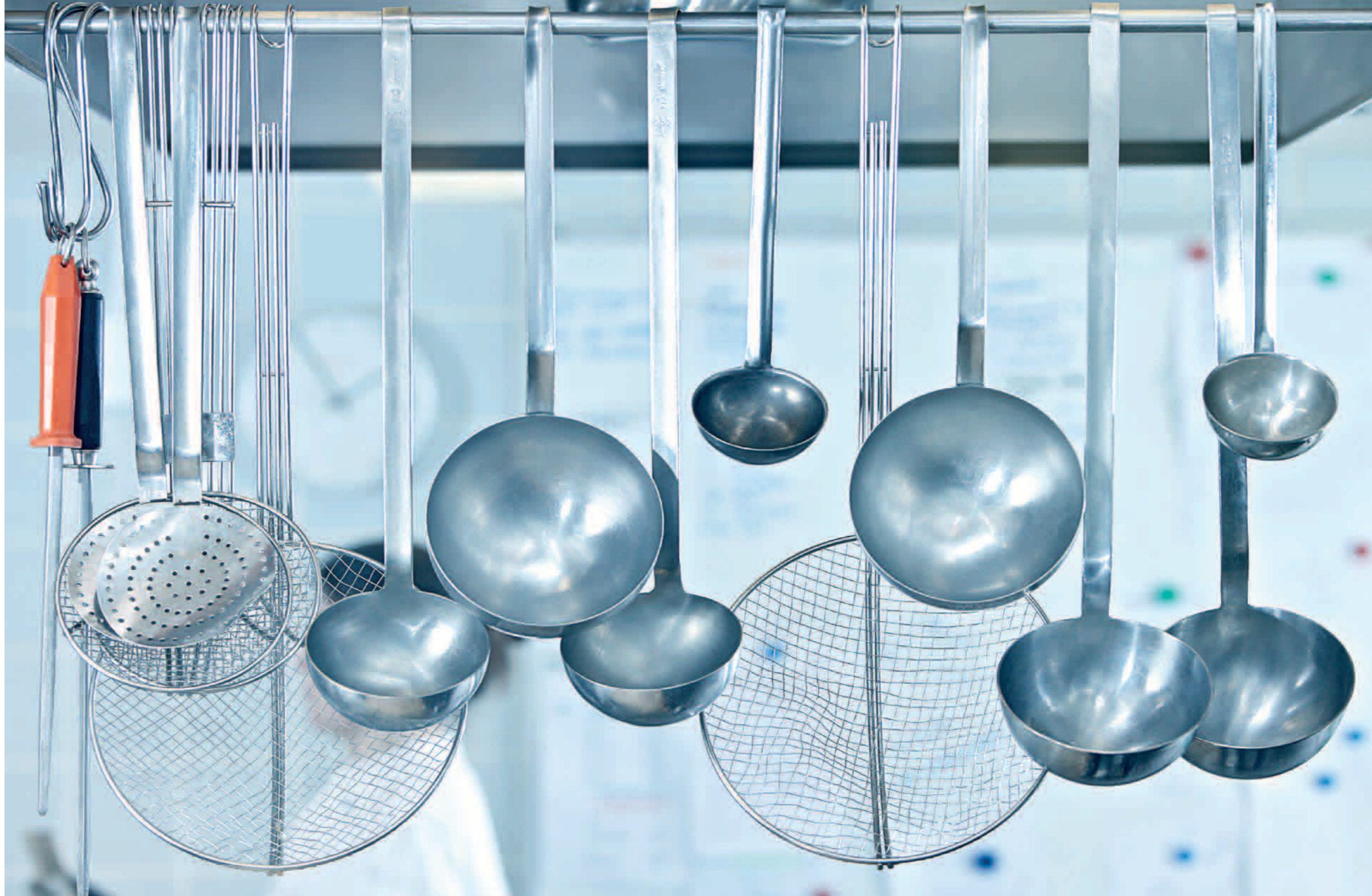


- COMMERCIAL KITCHENS**
- Commercial kitchen consultants and designers
 - Executive chefs, staff responsible for energy, staff responsible for buildings and others involved in kitchen design projects
 - Purchasers
 - Kitchen staff

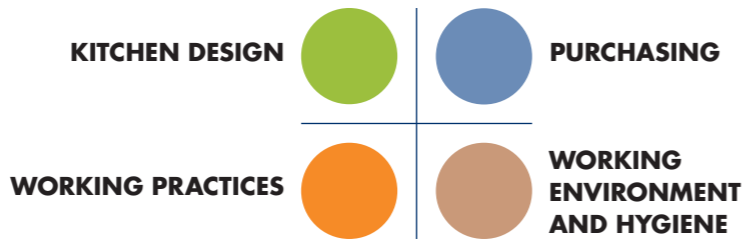


- SERVER ROOMS***
- Staff responsible for IT and system administrators
 - Staff responsible for energy
 - Staff responsible for buildings and operations and maintenance

* Only available in Danish.



The sections are colour coded for easy reference as follows:



Ingredients

Make your kitchen energy efficient	4	Dishwashing	14
Electricity consumption and energy efficiency in commercial kitchens	5	Cooking	17
Designing commercial kitchens	6	Ventilation	20
Fridges and freezers	10	Lighting	22

Order the Guidelines you need from the Trust's Customer Service Centre at +45 70 26 90 09 or goenergi@goenergi.dk.

Make your kitchen energy efficient

In many institutions and companies with commercial kitchens, the energy used in the kitchen accounts for a sizeable share of the total energy consumption. However, it is possible to reduce consumption by choosing energy efficient equipment, by designing the kitchen energy efficiently, and by adopting sensible working practices.

THE GUIDELINES COVER COMMERCIAL KITCHENS

These Commercial Kitchen Guidelines focus on professional kitchens. This means kitchens in institutions and companies where the preparation and production of meals takes place for a good number of hours daily. Commercial kitchens must use professional equipment to comply with Danish rules and regulations, and to cope with the intensive use to which the equipment is subjected.

WHO ARE THE GUIDELINES FOR, AND HOW CAN THEY BE USED?

The Guidelines are targeted at individuals and organisations who can influence, and take decisions about energy efficient commercial kitchens in Denmark. Please note that rules and regulations may be different in other countries.

WHO	HOW
Executive chefs, food and beverage managers, staff responsible for energy, staff responsible for buildings and others involved in designing or renovating commercial kitchens in public sector organisations or private companies.	<ul style="list-style-type: none"> As a source of inspiration and a checklist when the time comes to design the kitchen – both when renovating an existing kitchen or designing a completely new one.
Purchasers in public sector institutions and private companies.	<ul style="list-style-type: none"> When purchasing new products. As inspiration during the design process.
Commercial kitchen consultants and designers, and commercial kitchen equipment suppliers and retailers.	<ul style="list-style-type: none"> As a source of information to customers on the energy efficient options. As inspiration and guidance for in-house working practices.
Kitchen staff.	<ul style="list-style-type: none"> As guidelines for energy efficient working practices. As inspiration when involving kitchen staff in the purchasing of equipment for, and the design of a commercial kitchen.

FIND WHAT YOU NEED

The Guidelines contain helpful advice on reducing energy consumption in commercial kitchens covering the following three areas:

New design and renovation of commercial kitchens	Purchasing equipment for commercial kitchens	Focus on energy efficient working practices
--------------------------------------------------	----------------------------------------------	---------------------------------------------

You can read the complete Guidelines, or use them as a reference source for specific areas such as lighting or ventilation that you need to do something about. However, the Guidelines should not be used in isolation. You should also thoroughly research the options and requirements, and involve users and professional advisers.

ENERGY EFFICIENCY GOES HAND IN HAND WITH ...

The Guidelines focus on energy efficiency, but also touch on other areas that are significant for the design and running of commercial kitchens, including:

Working environment	Hygiene	Food quality
---------------------	---------	--------------

It is important from the start to keep all aspects in mind – working environment, hygiene, food quality, and energy efficiency.

REMEMBER

When you purchase an appliance you are also buying an energy overhead. Energy consumption can be a major item on the final bill.

This is why it pays to go for energy efficient appliances which, although they may cost more to buy, are a lot cheaper to run.

Look at the total costs over the lifetime of an appliance when you buy new equipment.

THE GUIDELINES ARE THE RESULT OF A PARTNERSHIP

The Commercial Kitchen Guidelines have been produced in partnership with industry associations, societies and users who all have connections with commercial kitchens.



Electricity consumption and energy efficiency in commercial kitchens

In most institutions and companies with commercial kitchens, electricity consumption in the kitchen is one of the big items on the energy budget.

EXAMPLES OF A KITCHEN'S SHARE OF CONSUMPTION

TYPE	HOTEL	HOSTEL	CAMPSITE	RESTAURANT
Share of institution's consumption	35%	25%	25%	70%

Source: HORESTA (1998)

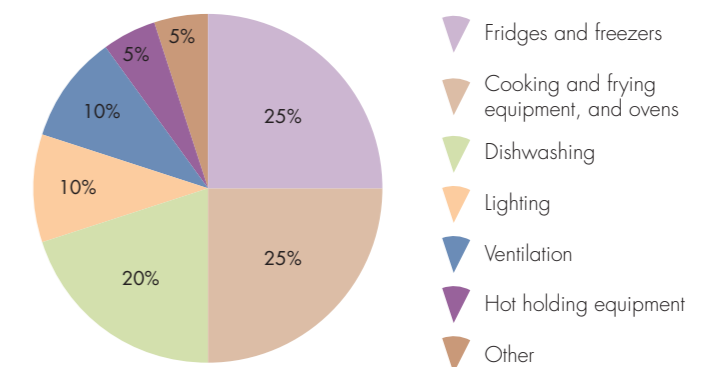
The majority of electricity consumption in a kitchen is used for cooking (cooking/frying equipment and ovens), fridges/freezers and dishwashing. In addition, there is electricity consumption by lighting and ventilation.

The allocation can vary from kitchen to kitchen depending on the form of production, etc.

You can make significant savings through sensible design, by choosing energy efficient equipment, and by adopting energy efficient working practices.

Electricity consumption in commercial kitchens in Denmark is about 1,200-1,400 GWh per year. This equates to about 15% of the electricity consumed by household appliances, and represents almost 4% of Denmark's total electricity consumption.

Typical consumption allocated by appliance type:



Designing commercial kitchens

A commercial kitchen is a workplace where food is produced for large numbers of people. When designing a kitchen you should therefore take into account that a kitchen should be a good and safe place to work, and that everyone should be able to eat the food produced there with confidence.

There are no contradictions between having a good workplace, excellent food and low energy consumption. There can often be a synergy between energy efficiency, the working environment and quality. Appliances that are more energy efficient do not give off so much heat, and this reduces the inconvenience associated with too high a room temperature. Energy efficient machines which are well insulated can also be more silent than equivalent uninsulated machines.

REMEMBER

- Factor in the working environment, indoor climate, hygiene, quality and energy efficiency from the start.
- Check the current regulations and whether you need to get approval from the authorities.
- Ask both users and professional advisors for advice.
- Short-term savings can be expensive in the long term.

DESIGN THE KITCHEN ENERGY EFFICIENTLY

Designing a kitchen energy efficiently can save you energy and money, and also improves the working environment. It is important to design a kitchen so that the area operates without consuming too much energy. One very important aspect is the location of the kitchen in relation to where the light falls, and how the appliances are installed in relation to each other. Also it is very important that you choose energy efficient equipment, and that the equipment meets the requirements for preparing and storing food.

HELPFUL ADVICE ON DESIGN AND INSTALLATION (See further advice about the different equipment in the sections on fridges/freezers, dishwashing, etc.)

- Make it a requirement that suppliers state the energy consumption when you receive offers for new professional white goods. All suppliers should state the consumption on the basis of the same measurements in order that you can compare different offers. See the Trust's recommendations for measurement methods at www.goenergi.dk/indkoeb (in Danish).
- Locate the kitchen north facing, thereby avoiding unnecessary sunlight and the resulting heat. This reduces the need for ventilation and the risk of the temperature in the kitchen becoming too high.
- Divide the kitchen into cold and hot zones. Install the fridges and freezers in the cold zones – that way they use less energy.
- Design the kitchen so the dishwasher can be connected to a hot water feed from the building's heating system if the building has ecofriendly hot water, e.g. produced by solar, district or natural gas heating.
- Design the kitchen with matching appliances, e.g. with oven equipment (containers, etc.) that match the fridge and freezer. This makes it easier to handle food that subsequently needs to be cooled down, and can result in a more efficient use of storage space.
- Design the kitchen with a cold store for bulk storage combined with a fridge in the kitchen for immediate needs, if a lot of refrigeration space is required.

HELPFUL ADVICE ON DESIGN AND INSTALLATION (continued)

- Design the kitchen with light surfaces so that light can be used more effectively. Surfaces should not be pure white or shiny.
- Design and equip the kitchen with commercial kitchen equipment.
- Ensure that the kitchen has effective ventilation with heat recovery and that the system is demand controlled.
- Use gas burners and possibly other gas appliances if natural gas is available in the building.
- Use water saving aerators on all tap fittings. This way you will save both water and energy (hot water).
- Choose energy efficient equipment so that the heat in the kitchen, and thus the need for ventilation and cooling, is kept to a minimum.
- Consider what size the appliances and equipment should be in relation to how the kitchen will be used and the variations in capacity requirements.
- Read more about energy efficient design in relation to the different appliances on the following pages.

WORKING ENVIRONMENT AND DESIGN

Commercial kitchens should provide a good working environment, so you should take into account the functions that need to be carried out there at the design stage, as well as ensuring that kitchen staff have good and safe working conditions. Energy efficiency can contribute to improving the working environment. This is because energy efficient appliances give off less heat and therefore contribute less to the thermal load in commercial kitchens, which is often far too high.

There are lots of regulations and guidelines covering the working environment in commercial kitchens as well as regulations about the design of rooms, indoor climate, ventilation, lighting, etc. See Danish Working Environment Authority guidelines/regulations at www.at.dk and Danish working environment council (BAR) at www.arbejdsmiljøweb.dk (in Danish).

HELPFUL ADVICE ON THE WORKING ENVIRONMENT

- Design the kitchen so its construction, machinery and equipment match the kitchen's function and to the kitchen's cost parameters.
- Locate and orient the kitchen so that ample light comes through the windows, but in such a way that avoids direct sunlight shining into the kitchen.
- Ensure proper ventilation so that hazardous particles are removed, and to prevent too high a temperature. Design ventilation to avoid annoying draughts.
- Design the kitchen so there is enough space around each work station, enough setting-down space round appliances, and room for a trolley, etc.
- Choose machines and equipment that put least possible strain on the environment, the working environment and the indoor climate. Buy energy efficient and relatively quiet equipment, ecolabeled products, and water saving tap fittings, etc.
- Ensure that equipment is easy and convenient to use, and that heavy lifting is avoided.
- Ensure that appliances and work surfaces are at suitable and adjustable heights.
- Design the kitchen so that there is a natural interrelationship between the function of the work stations and their locations. For example, it may be sensible to locate the cook table, washing of food and preparation locations in adjoining spaces, and the dishwasher in an area where the dirty tableware is received.
- See the following page for further advice and information on regulations/instructions/rules/etc. from the Danish Working Environment Authority.

Designing commercial kitchens

REGULATIONS, INSTRUCTIONS AND STANDARDS COVERING THE WORKING ENVIRONMENT

- Danish Working Environment Authority (WEA) Guidelines A.1.1 Ventilation in fixed workplaces.
- WEA Guidelines A.1.2 Indoor climate.
- WEA Guidelines A.1.5 Artificial lighting.
- WEA Guidelines A.1.9 Design of fixed workplaces.
- WEA Guidelines A.1.12 Temperature in working rooms at fixed workplaces.
- WEA Guidelines A.1.14 Planning the design of fixed workplaces.
- WEA Guidelines A.1.15 Workplace design and fixtures and fittings.
- Executive order on the design of fixed workplaces.
- Designing the good kitchen. Guidelines on new construction and renovation of kitchens in daycare institutions. Published by the Danish social and health working environment council.
- Danish Standard DS700 (contains special requirements which must be fulfilled by lighting systems in commercial kitchens).
- Guidelines on the design and installation of ventilation in restaurant kitchens. Published by the Danish service sector working environment council.
- Ventilation equipment for kitchens (VDI 2052).
- "Raumluftech-nische Anlagen für Küchen". German guidelines for calculating ventilation requirements in commercial kitchens (will shortly be adopted as European standard).
- See more at www.at.dk.

Please note that legislation may vary from country to country.

HYGIENE AND DESIGN

Commercial kitchens should be designed so that everyone should be able to eat the food prepared in them with confidence. To a large extent this is about designing a kitchen in which you can produce food without spreading any bacteria or other pathogenic material. There are rules and regulations covering the design, storage, handling and preparation of foods, and there are also general hygiene regulations.

To avoid bacterial growth, food should be cooled down quickly and stored at the right temperature. Furthermore, food should be heated and kept hot at temperatures that are high enough to kill bacteria and prevent bacterial growth. Storage and preparation at the correct temperatures is also important for energy consumption, and the quality of food. If the temperature while preparing and keeping food hot is higher than required for food safety, then energy consumption will be higher than necessary, and the quality of the food will deteriorate and the food will become inedible.

A commercial kitchen is a food business and as such is covered by the Danish Veterinary and Food Administration's regulations for this area. The regulations vary depending on the size, functions, etc. of the kitchen. For example, less onerous regulations apply to child care institutions (crèches, nursery schools, pre- and after-school clubs, and other types of activity clubs), where food is only prepared to a limited extent, and for sheltered housing units.

It is important to consult with the authorities in connection with the design and operation of commercial kitchens. Regional veterinary and food administration centres provide advice on the design and what fixtures and fittings are required by large kitchens. The Danish Veterinary and Food Administration website has sections about the regulations and relevant brochures. Find contact details for the regional centres at www.fvst.dk.

HELPFUL ADVICE ON HYGIENE

- Ensure that the kitchen is suitably designed and proportioned to make it easy to have good hygiene.
- Ensure that the kitchen is designed with enough refrigeration facilities in relation to the needs. The refrigeration temperature should basically be no more than 5 °C. However, some food requires to be refrigerated at temperatures not exceeding 2 °C, 4 °C, 10 °C or 12 °C.
- Design the kitchen with special equipment for cooling food down, if there is a need for rapid cooling. It is important that the equipment matches the cooling needs (types of food, capacity, etc.).
- Design the kitchen with equipment that makes the control process as straightforward as possible.
- Design the kitchen with cooking and hot holding equipment that makes it easy to check and adjust the temperature. This helps to ensure that food is heated up and kept hot at the correct minimum temperatures of 75 °C and 65 °C respectively.
- Design the kitchen with the option to keep raw and cooked food separate when storing and making food (separate workstations for different raw materials, etc.).
- Use materials that are easy to clean, and ensure that there are suitable facilities for washing, dishwashing and washing hands.

REGULATIONS, GUIDELINES AND INFORMATION MATERIAL (in Danish unless otherwise stated)

- Guidelines on hygiene regulations for kitchens in child care institutions (guidelines from Danish Veterinary and Food Administration).
- Guidelines on food hygiene (VEJ nr. 9440 af 25/07/2008).
- Hygiene Executive Order (BEK nr. 788 af 4/07/2008).
- Are you managing your kitchen properly (Har du styr på dit køkken?) (brochure from Danish Veterinary and Food Administration).
- General food regulation (EC) No. 178/2002 (in English).
- Guidelines on design, etc. of kitchens in sheltered housing units (guidelines from Danish Veterinary and Food Administration).
- Facts on food hygiene (brochure from Danish Veterinary and Food Administration).
- See more at www.fvst.dk.



Fridges and Freezers

Fridges and freezers account for about 25% of the electricity consumption in a commercial kitchen. It is important for food safety and quality that food is stored at the right temperature and that cooling down/freezing take place as quickly as possible.

In commercial kitchens, different types of refrigeration and freezer equipment are used, including:

Commercial fridges and freezers with insulated doors and lids	Cold store and freezer room	Special cooling/freezing equipment (blast freezers, etc.)
---------------------------------------------------------------	-----------------------------	-----------------------------------------------------------

Commercial fridges and freezers differ from their household equivalents by having a much larger refrigeration capacity, and are also designed to be used much more intensively.

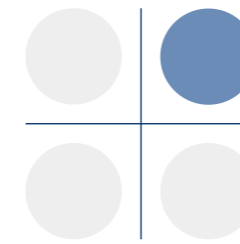
DESIGN

When designing a commercial kitchen it is important to determine how much food storage is needed, and at what temperature the food should be kept. Should one or several fridges be used; is a freezer and/or special cooling or freezing equipment required? If a large amount (in volume terms) of fridge space is required, would it be worth considering a freezer room for bulk storage?

Hot food should be allowed to cool down before it is placed in the fridge. Otherwise the temperature of the other food in the fridges will quickly rise, which can end up being a health risk. If hot food needs to be cooled down then the kitchen should be designed with special cooling equipment. Depending on the type of food this could be a blast freezer, a tilting pan with built-in water cooling, a special Bain Marie, etc. In addition, it may be a good idea to ask suppliers to deliver food in a chilled state.

HELPFUL ADVICE ON DESIGN AND INSTALLATION

- Design the kitchen so that both the cabinets and all doors/lids of fridges and freezers are well insulated. Avoid glass lids or open display cabinets.
- Design the kitchen so that fridges and freezers are not placed right next to, or near, areas which are greatly affected by the heat from the cooking stations, ovens and dishwashers, or in areas with direct sunlight. The amount of energy used by fridges and freezers rises with the room temperature.
- Ensure there is good air circulation in front of, and over the fridge. When building-in fridges and freezers it is vital that there is sufficient air circulation to allow the condenser unit to get rid of the heat. Follow the instructions from the supplier.
- Use fridges and freezers (vertical cabinets of refrigerated counters) for storage close to the working area. If more storage space is needed, then use a cold store or freezer room for bulk storage. These should only be used as remote storage otherwise the energy consumption will be too great on account of the long and frequent periods of time when the doors are open.
- Construct the cold store or freezer room with good insulation. Fit plastic strip curtains in the door openings. This reduces the amount of warm air coming into the cold store or freezer rooms when the doors are open. Construct the refrigeration installation with the condenser in a cool location, possibly outdoors if this is feasible.
- Design the kitchen so the condenser unit can be easily cleaned. If the appliance is to work efficiently it should be cleaned at least twice a year. It may be an idea to place the condenser on lockable wheels for easy access.
- Equip the kitchen with energy efficient commercial fridges and freezers. These are more durable and have a larger capacity than household fridges or semi-professional appliances. Read more about the requirements for commercial fridges and freezers in the Danish Energy Saving Trust's Purchasing Guidelines 2011.
- If several fridges need to be used, consider whether one could be a chiller cabinet. This uses less energy because the temperature in the cabinet is 10 °C instead of 5 °C.



PURCHASING

You can save a lot of energy and money by choosing the most energy efficient fridges and freezers. The Danish Energy Saving Trust has purchasing guidelines for commercial fridges, refrigerated counters, and freezers with insulated doors.

COMMERCIAL FRIDGES AND FREEZERS

Requirements established by the Danish Energy Saving Trust based on schemes in the UK

TYPE	VOLUME Litres	MAX. POWER CONSUMPTION kWh/48 hours/m ³	
		Fridges	Freezers
Cabinet with single door	0-319	20	40
Cabinet with single door	320-719	15	40
Cabinet with double door	720-1.560	12	36
Refrigerated counters	0-800	20	-

Fridges should be classified in temperature class M1 (+5 °C) and freezers in temperature class L1 (-18 °C).

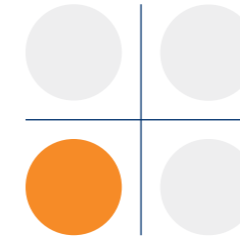
Products should be tested in accordance with EN441 or DS/EN ISO 23953, climate class 4. Where appliances are tested in accordance with DS/EN ISO 23953, the result of the energy consumption measurement should be adjusted by +10%.

A modified test method applies to refrigerated counters having more than 2 lids, namely that only the outer left and outer right lids are opened during the test.

Note: It is not possible to compare power consumption of commercial appliances with domestic appliances because different rules apply to the testing of domestic and commercial equipment.

HELPFUL ADVICE ON PURCHASING EQUIPMENT

- Ensure that the cooling/freezing equipment has enough capacity to comply with the regulations set by the Danish Veterinary and Food Administration covering how quickly food should be cooled down/frozen.
- Go for appliances that conform to the Trust's Purchasing Guidelines. The Trust has established requirements for commercial fridges and freezers with insulated doors (see above).
- Find energy efficient appliances on the Trust's product overviews of commercial fridges and freezers at www.savingtrust.dk/professional-white-goods.
- Ensure that the cabinet size matches your needs.
- When comparing tenders, ensure that tenders are worded in such a way that operating costs are included in the purchase price. Before comparing different tenders, all suppliers should show the consumption based on the same measurement method. See the Trust's recommendations on measurement methods at www.goenergi.dk/indkoeb (in Danish).
- Buy appliances which display the temperature in the fridge or freezer. This makes it easier to control and adjust the temperature.
- Purchase fridges and freezers with insulated doors and lids (avoid glass lids and open cabinets).



WORKING PRACTICES

Food should be stored at the right temperature. Energy consumption will be higher than necessary if the temperature in the fridge or freezer is too low. Conversely, too high a temperature reduces the keeping qualities of the food, and the food can go off.

As a rule, the temperatures in a fridge and freezer should be 5 °C and -18 °C, respectively. However, some food should be kept at lower or higher temperatures. Raw fish and meat with a long "use by" date should be stored at 2 °C, whereas most vegetables keep best at about 10 °C (please note that temperature requirements may vary from country to country).

You can ensure that fridges and freezers operate as energy efficiently as possible by using them correctly. If there is a lot of ice on the evaporator and dust on the condenser, the refrigeration system will not operate optimally, and consumption will be too high.

HELPFUL ADVICE ON WORKING PRACTICES

- Be sure to set the temperature correctly (not lower than necessary). If the fridge temperature is one degree too low, electricity consumption rises by about 5%. If the freezer temperature is one degree too low, the electricity consumption rises by about 2-3%.
- If the appliance has a temperature display, use an extra thermometer to check that the temperature displayed is correct.
- Switch off appliances if there is no food in them over the weekend, holidays, etc. Let the door stand ajar when an appliance is switched off.
- Cover open appliances (e.g. display cabinets) with a lid or insulated cover whenever possible depending on how the appliance is used. Typically, you can reduce the electricity consumption by about 20%, and simultaneously improve the quality of the food.
- Only use cold store and freezer rooms for bulk storage. This avoids the doors being opened many times a day. Door opening associated with putting in, and taking out food is a major contributor to increased energy consumption. Ensure an efficient work process so doors are open for the shortest possible time.
- Defrost the cabinet if there is more than 5 mm of ice on the evaporator. Too much ice compromises the efficiency of the refrigeration system. A small coating of ice up to 5 mm makes very little difference to the electricity consumption. Most commercial fridge and freezer cabinets have auto defrost, so normally there is no need to defrost them.
- Clean the condenser at least twice a year, or more often if it gets very greasy.
- If the freezer has a fast freeze function, remember to switch it off as soon as freezing is complete.
- Close the door immediately after use. Remove all chilled and frozen items in one go, so the door is not opened more than necessary. The more, and the longer a door stays open, the greater the energy consumption.
- Thaw frozen items in the fridge, but make sure that raw food is separated from cooked food at all times.
- Switch off the lights in the cold store and freezer rooms.
- Ensure there is good air circulation round the items in the fridge, otherwise they will cool down too slowly, resulting in a reduced shelf life. Air should be able to circulate round the food to achieve efficient refrigeration. The cabinet should therefore not be over filled, and items should be placed directly at the bottom of the cabinet.
- Cool hot food down in special cooling equipment. Cooling down in ordinary fridges and freezers is too slow, and other food items in the cabinet get too warm, which can compromise food safety.
- Cover all food. Uncovered food releases moisture, and this can cause the evaporator to ice up, thereby increasing the energy consumption. The food will also dry out, which negatively affects its quality.
- Ensure doors are always properly closed and fit tightly. Keep seals clean and replace them if they are cracked or have any other defects.

Dishwashing

Dishwashing accounts for a large part of the electricity used in commercial kitchens. There are two types of dishwashers used in commercial kitchens: Tank dishwashers and fresh water dishwashers.

Tank dishwashers can be divided into three categories: Tunnel dishwashers (single or multi tank machines), hood dishwashers, and under counter machines. Tank dishwashers require a tank in the machine to be filled with a large amount of water at start-up. This water is used to wash a number of baskets, after which the water is changed. For each basket that is cleaned, several litres of clean hot water are added for use in the last hot rinse. Dishwashing times for tank machines are very short (1½-5 minutes).

In principle, commercial fresh water dishwashers operate in the same way as household dishwashers. The machines take in fresh water every time they wash, and the dishwashing time is therefore longer than for tank machines – typically 30 minutes.

The principal rule as far as hygiene is concerned is that dishwashing in a commercial kitchen should take place with the rinse water temperature maintained at a minimum of 80 °C. However, in some cases the requirement is relaxed for child care institutions and sheltered housing units (see reference to guidelines on page 9).



DESIGN

Before designing the dishwashing element in a kitchen, and before buying the machines and equipment, it is important to have a clear idea of the needs that the equipment will fulfil. These include how much, and what sort of dishwashing is necessary, how long the process should take, and the temperature requirement for the final rinse.

EXAMPLES OF TYPICAL CAPACITIES OF DIFFERENT TYPES OF DISHWASHERS

TYPE	CAPACITY
Tunnel dishwasher	100 baskets per hour
Hood dishwasher	40-60 baskets per hour
Under counter (Tank dishwasher)	20-40 baskets per hour
Under counter (Fresh water dishwasher)	2-3 baskets per wash*

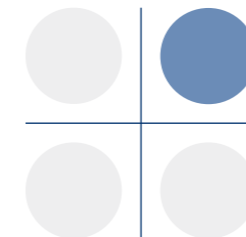
* Dishwashing time for fresh water machines from about 20-60 minutes per wash.

HELPFUL ADVICE ON DESIGN AND INSTALLATION

- Choose a dishwasher that matches the size and function of the kitchen. Choose a tunnel dishwasher for really big commercial kitchens, a hood dishwasher or an under counter tank model for large kitchens, or one or two commercial dishwashers, with fresh water feed for each wash, for small kitchens, where slightly longer dishwashing time is acceptable.
- Depending on the size of the kitchen, consider equipping the kitchen with two professional fresh water dishwashers (under counter models) rather than one tank machine. Fresh water dishwashers should only be used in kitchens with limited dishwashing needs. Fresh water machines should be fitted with steam condensers and should use hot water at 80 °C for the final rinse. Place fresh water machines about 40 cm above the floor.

HELPFUL ADVICE ON DESIGN (continued)

- Consider from the start whether a tunnel dishwasher is the best solution. Tunnel machines are the most expensive, but they are also the most energy efficient solution when used in really big kitchens, but they do require space.
- Design the kitchen so that tank dishwashers can be connected to hot water supplied by the building's hot water system. This reduces the energy consumption and shortens the machine's warm-up time. A hot water feed is a particularly good idea if the hot water is heated by solar energy, district heating or natural gas. There are no energy benefits if the water is heated by electricity.
- Ensure that kitchens with tunnel or hood dishwashers are equipped with heat recovery. You can save a lot of energy by having heat recovery of both extracted air and waste water.
- Remember that when connecting hot water it is important to locate the dishwasher as close as possible to the hot water tank.
- Design the kitchen so there is sufficient air extraction around the dishwashers.
- Design the kitchen so there is enough setting-down space for the tableware waiting to be washed and full baskets that are ready to go into the dishwashers. When using tank dishwashers, the most energy efficient wash is achieved by collecting all the tableware and running a large number of baskets through the machine in one continuous process.
- Ensure that the dishwashing section is separated from the food preparation areas, and that it is sensibly located near where the dirty tableware comes into the kitchen.



PURCHASING

You can save a lot of energy and water by choosing energy efficient, water-saving dishwashers for commercial kitchens.

There are no labelling schemes or product overviews covering energy efficient commercial dishwashers. However, the Danish Energy Association has a list of dishwashers with data covering many hood dishwashers. The list features both energy efficient machines and data on typical appliances on the market.

HELPFUL ADVICE ON PURCHASING

- Under counter tank-type dishwashers and commercial fresh water machines are very much cheaper to buy and operate than hood dishwashers. Consider whether these types of machine can meet your needs.
- When comparing tenders, ensure that tenders are worded in such a way that operating costs (energy and water consumption) are included in the purchase price. Before comparing different tenders, all suppliers should show the consumption based on the same measurement method. For tank dishwashers, the Trust recommends the measurement method developed by the Danish Technological Institute. Find the method at www.goenergi.dk/indkoeb (in Danish).
- Check what your dishwashing requirements are, and choose a dishwasher that meets these needs.
- See data on hood dishwashers at www.sparelisten.dk/spareopvaskemaskiner (in Danish).
- Go for tank dishwashers that use a minimum amount of water per basket. This should not exceed 2.5 litres per wash/basket. It may be necessary to use more water per basket for machines with a very large basket/large number of place settings per wash. Low water consumption per basket also results in low energy consumption.
- Choose tank dishwashers with an insulated tank and hood dishwashers with a double insulated hood.

Dishwashing

HELPFUL ADVICE ON PURCHASING (continued)

- Hood dishwashers and tunnel machines should have air extraction. There should be a condenser extractor hood over the machine and the drying area to capture the hot moist air from the machine and the tableware being washed. Choose a machine that automatically switches off the extractor when the dishwasher is not in use (at least 30 minutes should elapse before the extractor is switched off).
- Choose tunnel dishwashers with heat recovery and insulation. Tunnel machines are also available with a built-in heat pump, which uses the heat from the extracted air to heat the water in the tank and for pre-heating the rinse water.
- Dishwashers are often noisy so you should ask about how much noise a machine makes. The best dishwashers have a noise level of about 63-65 dB(A).
- Ensure that a machine comes with an automatic detergent dispenser or is capable of having one fitted.
- Consider purchasing a tunnel machine that recycles the wash water for pre-rinsing in a special pre-rinse section. This saves a lot of water because it eliminates the need for the usual fresh water pre-rinse. If you normally use hot water for the pre-rinse, you can also save a lot of energy, especially because you do not need to use hot water for pre-rinses (see working practices section below).
- Save energy by purchasing a dishwasher with the option to choose a lower final rinse temperature if you do not need to rinse at 80 °C. See more information on hygiene requirements in the Danish Veterinary and Food Administration's guidelines (in Danish) for child care institutions and sheltered housing units.
- Buy tank dishwashers with hot fill. These are good for the environment (unless the hot water in building's heating system is heated by electricity), and have the added benefit of rapid warm-up time.

WORKING PRACTICES

Working practices have a big impact on how much energy is used for dishwashing. You can save a lot by making sure that tank machines are only switched on when it is time to do the dishes, and by collecting the tableware and washing the dishes in one continuous process.

HELPFUL ADVICE ON WORKING PRACTICES

- Tank dishwashers which are switched on while standing idle waste a lot of heat. Ensure they are switched off, or in sleep mode with a lower temperature in the water tanks when not in use.
- Do not switch a tank dishwasher on in the morning, but only before you need to do the dishwashing.
- Switch off machines on completion of the last wash. Do not leave tank machines switched on overnight.
- Reduce the final rinse temperature when hygiene requirements allow (e.g. in child care institutions and sheltered housing units).
- Collect all the tableware, wash up in a continual process, and fill the baskets right up.
- Use a cold pre-rinse for tank machines and a pre-rinse spray valve with aerator. A cold water pre-rinse saves energy and improves the quality of the dishwashing because it helps to remove proteins which might otherwise stick to the tableware in the main wash.
- Switch off the extractor over tank machines when not needed, and close the hood of the hood dishwasher.
- If you have a fresh water machine, do not rinse the tableware off before you load it into the dishwasher. Modern dishwashers can wash clean as long as you scrape food remnants off the plates.
- Fill the machine up before running it. This saves water and electricity, with less wear and tear on the machine.

Cooking

Cooking accounts for about 25-30% of the electricity consumed in commercial kitchens. Cooking equipment comprise a huge range of products including cookers and ovens, cooktops, grills, deep fryers, different types of hot holding and cooling equipment, and coffee makers.

You can save a lot of energy by choosing energy efficient equipment and by ensuring that you use the appliances efficiently. Working practices have a huge impact on the amount of energy used for cooking.

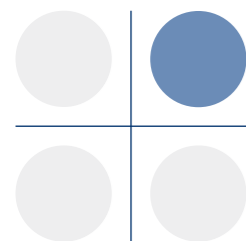
DESIGN

Kitchens should have equipment that matches the cooking needs. Small kitchens, where the equipment is used for a limited time, can possibly be equipped with household equipment, but commercial kitchens, where the equipment is used daily for many hours, require professional equipment. Professional appliances are designed to operate for many hours and are typically faster, and have a larger capacity than household equipment. When choosing equipment it is important to be aware of the hygiene regulations, the regulations covering the preparation and heating of food, working postures, etc.



HELPFUL ADVICE ON DESIGN AND INSTALLATION

- Design and equip kitchens with energy efficient appliances for cooking, frying, heating up and hot holding. Equipment should be fit for the intended purpose.
- Be aware that induction plates are the most energy efficient cooktops. Conversely, gas burners have the lowest CO₂ emissions. Induction cooktops and gas burners heat up very rapidly and are easy to regulate.
- Use glass ceramic cooktops (preferably with a pan sensor that switches off the heat when the pan is removed) in preference to cast iron cooktops. Glass ceramic cooktops have a much shorter reaction time and less waste heat accumulates in the cooktop.
- Save energy by equipping the kitchen with two small ovens instead of one large one, if the requirement for oven capacity varies a lot from day to day.
- Ensure there are extractor hoods above all cookers and cooking and frying zones with sufficient capacity to remove cooking smells and steam.
- Design and equip the kitchen with appliances that make it easy to adopt energy efficient working practices. This means appliances that heat up quickly and efficiently, have thermostatic control, built-in thermometer/temperature display/timer (if relevant).
- Choose cooking stations and utensils that are complementary. For the greatest flexibility, choose glass ceramic cooktops that have heating zones that can be switched on/off based on the size of the utensils. With induction, the heat is generated in the bottom of the utensil, so the size of the utensil and the cooktop should always match. Remember that the induction system requires you to use utensils with a ferrous base.
- Choose cooking zones that provide enough space to fit the utensils needed.
- Design and equip the kitchen with one or more professional ovens. Smaller institutions can, however, be equipped with one or two ordinary household ovens. These are much cheaper and use less energy, but also have less capacity. Place a household oven about 85 cm above the floor. If you have two ovens, you should install them side by side.
- Use gas for cooking stations and other relevant equipment, if the building has natural gas.
- If a household cooker hood is sufficient (air volume of up to 500m³/hour) then you can find energy efficient extractors at www.spareemhaette.dk (in Danish).
- Design the kitchen to minimise heavy lifting, and fit height adjustable equipment if relevant.



PURCHASING

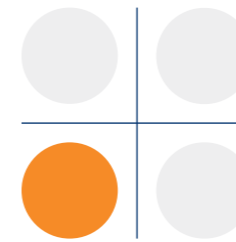
You can save a lot of energy by choosing energy efficient cooking equipment. The choice of energy efficient appliances is complicated by the fact that there are no labelling schemes or product lists for energy efficient cooking equipment. However, you can make savings by following the advice below.

HELPFUL ADVICE ON PURCHASING

- Choose professional appliances. These are designed to conform to the hygiene regulations and to handle the intensive use in a commercial kitchen.
- If you choose ordinary class ceramic cooktops, go for models with pan sensors that switch off the cooking zone when a utensil is removed.
- When comparing tenders, ensure that tenders are worded in such a way that operating costs are included in the purchase price. Before comparing different tenders, all suppliers should show the consumption based on the same measurement method. See the Trust's recommendations at www.goenergi.dk/indkoeb (in Danish).
- Only purchase equipment with lids, e.g. pans, tilting pans, deep fryers, hot holding equipment, etc.
- Buy tilting pans, tilting frying pans, and cooking and frying stations that are height adjustable (electric).

HELPFUL ADVICE ON PURCHASING (continued)

- Purchase induction cooktops in preference to traditional metal cooktops or ordinary glass ceramic cooktops.
- Purchase equipment with automatic control that encourages energy efficient working practices. This may be thermostatic adjustment, built-in thermometer/temperature display, and built-in on/off timer or similar.
- Buy tilting pans and frying pans that have:
 - › Good insulation.
 - › Fast and efficient heating up (high output).
 - › Stepless temperature adjustment and preferably temperature display. Consider buying appliances that adjust automatically based on the temperature of the food – thereby avoiding over cooking and unnecessary evaporation.
- › A well fitting lid (preferably hinged).
- › Automatic on/off timer (so all equipment is switched off at the end of the working day).
- › Low standby consumption.
- › Electric tilting function (or some other tilt system that is easy to operate).
- › Adjustable height option.



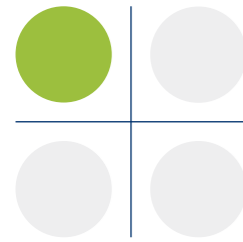
WORKING PRACTICES

You can make big savings by taking an energy efficient attitude to food preparation. Good working practices can reduce energy consumption by 50% or more.

HELPFUL ADVICE ON WORKING PRACTICES

- Delay switching on equipment until shortly before use, e.g. Bain Mariés for hot holding, cooking and frying zones, tilting pans, deep fryers, ovens, etc. Unlike newer equipment, old ovens and cooktops can take a long time to heat up. Do not allow old habits of leaving equipment on all day continue for new appliances. These can be switched on just before use.
- Switch off cooktops, ovens and other equipment when not in use. Appliances that sit there doing nothing use a lot of energy. Consider using an on/off timer.
- Reduce the temperature during quiet times if it is not possible to switch off the equipment completely.
- Ensure that you put a cover on the equipment when possible. You can save up to 50% of the energy used by putting a cover on tilting pans and frying pans, frying stations and deep fryers during warm-up.
- Only use steam in the oven when the quality of the product being prepared makes this necessary. The steam function increases energy consumption.
- Set the warming cabinet and other hot holding equipment at the lowest allowable temperature, usually 65 °C. Check the temperature regularly. Too high a temperature results in too much energy used.
- Ensure that the seals on the ovens and lids on the pots fit tightly. Replace faulty seals and defective lids.
- Save energy by filling the oven up, use the heat before and after the cooking process and use the least possible water when boiling vegetables, etc.
- Use a microwave oven instead of an ordinary oven for small portions. Remember food must be heated to at least 75 °C (not just on the surface, but right through).
- Ensure that the gas burners are adjusted so the flame is about 2 cm from the bottom of the pan. The flame is at its most energy efficient at this height.

Commercial kitchens require ventilation to ensure a good indoor climate and acceptable working conditions. Ventilation removes excess heat and harmful air pollution from frying and other processes. Ventilation accounts for about 10% of the electricity used in commercial kitchens.



DESIGN

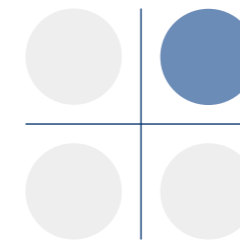
Ventilation in commercial kitchens should be a combination of general ventilation and local extraction. Extractor hoods should be fitted over equipment that gives off smells and steam, for example over cookers, ovens, grill tops and dishwashers. When designing ventilation for commercial kitchens it is advisable to involve planning experts in drawing up the requirements and specifications to satisfy both the ventilation needs and the legal requirements.

HELPFUL ADVICE ON DESIGN AND INSTALLATION

- Design the kitchen with a demand controlled ventilation system that both extracts and blows in fresh air, also called a balanced ventilation system. When correctly dimensioned, a balanced system ensures that enough replacement air is supplied to the kitchen.
- Ensure that a new ventilation installation fulfils the Danish building regulations that require that a ventilation system is fitted with heat recovery with a temperature efficiency of at least 70%. However, the requirement may be waived in situations where the extracted air cannot be used in a satisfactory way.
- Construct the ventilation system using energy efficient fans and ensure that ventilation ducts are sufficiently large, and that all bends are gently rounded, thereby avoiding unnecessary losses.
- Avoid using thin or flexi ventilation hoses. A lot of energy is lost in both these types of hoses. Flexi hoses have a limited lifetime and hygiene problems can occur.
- It is important that extractor hoods and ventilation systems are correctly dimensioned relative to the extraction needs. The requirement can be calculated as shown in the German guidelines „Ventilation equipment for kitchens (VDI 2052)“.
- The extracted air should be replaced by fresh air blown into the areas where kitchen staff are working, at the right temperature, silently, and with no draught. In some cases it may be necessary to provide cooling. The replacement air should equate to about 95% of the total volume of air extracted. The replacement air should not come from the restaurant area or other indoor spaces.
- Construct the ventilation and extraction so the normal air temperature in kitchen work spaces is about 20-22 °C. Airflow speed should not exceed 0.4 m/s round the room.
- The air from the extractor hoods should be vented out into the atmosphere. There should be a sufficient distance between the extractor outlet and the ventilation inlet to prevent the polluted air being sucked back in.
- There should be extractor hoods over all boiling and frying stations with enough capacity to remove smells and steam. Extractors should be fitted with lights. Use an energy efficient light source with good colour rendering (e.g. CRI of at least 90).
- Greasy air from commercial kitchens can reduce the heat recovery efficiency of a ventilation system. However, there should be no problems if the system is designed with the correct filters, and these are maintained and cleaned properly.
- Choose cyclone filters and avoid the mesh type of fat filters, because the energy consumption increases as the filter gets dirty.
- Place equipment such as cooking and frying stations in a niche with 1 back and 2 side walls, thereby reducing the air volume that needs to be extracted. When the air volume decreases, the amount of energy used also falls. If a niche is not possible, then place the equipment in a corner or, as a minimum, up against a back wall. Equipment in an island setting typically requires up to 60% more air to be extracted compared with equipment fitted against a back wall.

HELPFUL ADVICE ON DESIGN AND INSTALLATION (continued)

- Extractors above appliances that give off fat and oil particles into the atmosphere should be fitted with fat filters. These should be easy to remove and clean (i.e. can be put in the dishwashing machine).
- Fit hoods at a height of about 2 metres.
- Extraction from hoods or dishwashers should have a process monitor that triggers an alarm if the extraction is not sufficient or the ventilation stops running.
- See guidelines on ventilation in restaurant kitchens at www.bar-service.dk/Files/Billeder/BARservice/pdf/Hotel/104703_ventkok_d.pdf (in Danish).

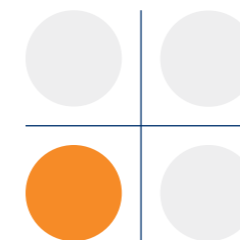


PURCHASING

Buy energy efficient fans, extractor hoods, etc. The Danish Energy Saving Trust has purchasing requirements for fans and wall-mounted extractor hoods with a capacity of up to 500 m³/hour (primarily for household use). These extractor hoods are not powerful enough to handle the extraction requirements of cooking and frying stations, but they can be used in places with lower extraction needs, e.g. in small institutions.

HELPFUL ADVICE ON PURCHASING

- Buy fans that conform to the Danish Energy Saving Trust's purchasing requirements. See www.savingtrust.dk/publications.
- Avoid purchasing belt driven fans. These have low energy efficiency.
- Buy energy efficient light sources for extractor hoods with a colour rendering index (CRI) of at least 90.



WORKING PRACTICES

You can save a lot of the energy if the extractor hoods and ventilation systems only run when required, and are matched to needs. However, it is important that the installations function properly. There should be neither too much, nor too little extraction and ventilation. If there are too many air changes, electricity consumption will be far greater than necessary. Not enough air changes can lead to indoor climate and health problems.

HELPFUL ADVICE ON WORKING PRACTICES

- Ensure extractor hoods and ventilation systems only run when required. Switch off ventilation at night, and turn installations down when demand is low.
- Only switch on extractor hoods over cooking and frying stations when you need to use the appliances. An extractor hood uses about 1½ times more electricity at the highest speed than at the lowest. Only increase the speed when there is smoke or steam.
- Regularly clean the fat filters in extractor hoods – about once a week, or as required.
- Check the installation at least once every 5 years as required by the Danish Energy Agency. See www.femsek.dk (in Danish).
- Consider making an agreement to get the ventilation installation regularly checked and serviced. Experience shows that this can be well worth while.
- Check that process monitors on extractors and ventilation systems are functioning. Clean or replace the filters as soon as the alarm indicates that there is insufficient extraction.

Lighting accounts for about 10% of the electricity used in commercial kitchens. Apart from light, all light sources give off heat and therefore contribute to what is already a considerable amount of heat in commercial kitchens. The use of energy efficient lighting reduces both electricity consumption and the need for cooling during ventilation. If there is no cooling, the working environment is improved as a result of the lower temperature produced by the lighting.

Daylight and good lighting plays a major part in our welfare. A poor working light can lead to various problems such as tiredness or headache, and too little light can reduce safety, for example in work spaces that involve cutting and trimming. Good light is also important for the visual impact of the food prepared in the kitchen. You can make big savings by choosing energy efficient light sources and fittings, by using suitable lighting control, and by switching off lights that are not required.

DESIGN

It is important to design lighting that takes energy efficiency, the working environment, and the visual aspects into consideration. You will achieve the desired result by using the correct fittings and light sources.

The Danish building regulations stipulate requirements for artificial lighting in workplaces. The requirements are described in greater detail in Danish Standard 700 „Artificial lighting in work spaces” (in Danish).

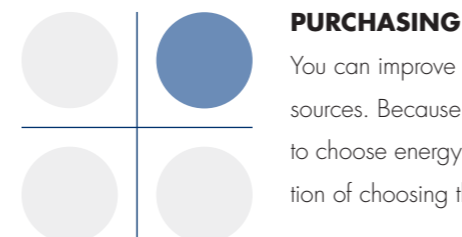
HELPFUL ADVICE ON DESIGN AND INSTALLATION

- Ensure that kitchen lighting complies with the requirements on artificial lighting in workplaces. See VEA Guidelines A.1.5, and Danish Standard 700 (both in Danish).
- Design the lighting to comply with the Danish building regulations on daylight control, movement sensors (for infrequently used rooms), and the division of lighting installations into zones.
- Locate the kitchen to allow the most possible light through the windows. It can be an advantage if the windows are north-facing to avoid unnecessary glare and heat.
- Ensure that the lighting comprises a combination of daylight, standard lighting and working lights for individual workspaces.
- Ensure that the kitchen has light-coloured matt surfaces (not pure white). Shiny surfaces can produce annoying reflections.
- If the kitchen is used during the day, and there is sufficient daylight, design the kitchen with daylight control of the general room lighting.
- Do not design the kitchen with fittings that are suitable for incandescent bulbs. These will be phased out in the coming years.
- Design the lighting so that room lighting, and work-space lights can be switched on and off individually.
- Be aware that lighting should be at least 200 lux as measured at the workspace, e.g. the dishwashing area. Some work tasks such as food preparation require more powerful lighting (500 lux). It is not necessary to light the whole kitchen at 500 lux.
- Choose lighting with good colour rendering for food preparation areas and other places where colour rendering is important. Go for energy efficient light sources such as LEDs, fluorescent lamps with particularly good colour rendering, or energy efficient types of halogen bulbs.
- Divide the lighting installation into relevant zones, and design the system with movement sensors that switch the lights on and off based on the activity in the room.
- Design the kitchen with light fittings with an efficiency rating of at least 50%, and make sure that the lights are completely switched off when there is no need for artificial lighting.
- Ensure that all fittings with fluorescent lamps or compact fluorescent lamps (CFLs) have electronic high frequency ballasts.
- Use lighting installations with a maximum standby consumption of 1 watt when standby is activated.

HELPFUL ADVICE ON DESIGN AND INSTALLATION (continued)

- Design and install the fittings where they do not dazzle, and can be easily cleaned.
- Read more about energy efficient lighting in the

Trust's Interior Design Guidelines, and the Purchasing Guidelines 2011 at www.savingtrust.dk/public-and-commerce/products/lighting.



PURCHASING

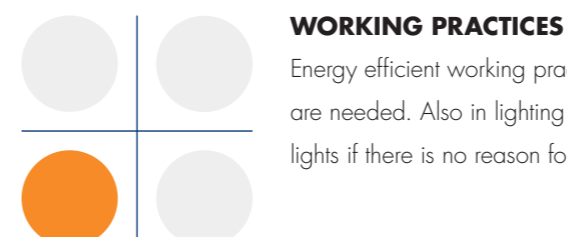
You can improve the lighting and halve your electricity consumption by replacing old fittings and light sources. Because lighting installations are often an investment over a 10 to 20-year horizon it is important to choose energy efficient fittings and light sources. In situations where fittings are not replaced it is a question of choosing the most efficient light sources that match the fittings.

HELPFUL ADVICE ON PURCHASING

- Buy A-rated light bulbs listed at www.savingtrust.dk/a-rated-bulbs. These fulfil the requirements for quality and energy efficiency.
- Go for energy efficient C-rated halogen bulbs if A-rated light bulbs or LEDs cannot be used. Read more about them at www.savingtrust.dk/halogen-bulbs.
- Use the Trust's diagnostic tools to help you evaluate existing lighting and calculate the financial implications of installing a new system.
- Suppliers of energy efficient light sources must provide information on the output, luminous flux, efficiency, lifetime, switch on time, colour rendering, mercury content, etc. on a publically accessible website.
- Keep an eye on LED solutions which are developing

very rapidly. The quality is improving all the time with more and more applications coming on stream. Read more about LEDs in the Trust's report „Light emitting diodes for lighting – the light source of the future” at www.savingtrust.dk/leds-for-lighting.

- Carry out a thorough survey before choosing a system. Involve the users and, where necessary, a lighting consultant.
- Follow the SBi 220 instructions when installing a lighting control system. Recommendations include advice on setting requirements for functionality, tenders, etc.
- Choose fittings that are robust, easy to clean, and well screened (i.e. users do not see the light source). Also, always view a sample fitting with a light source in it.



WORKING PRACTICES

Energy efficient working practices are especially about ensuring that lights are only switched on when they are needed. Also in lighting control situations, you can benefit from additional savings by switching off the lights if there is no reason for them to be on.

HELPFUL ADVICE ON WORKING PRACTICES

- Switch off the lights when nobody is in the room, or if the lights are not required for some other reason.
- Ensure that fittings and light sources are kept clean.
- Check whether you have fittings and lamps with inefficient light sources (incandescent bulbs, traditional halogen bulbs, etc.). Switching to more energy efficient lighting quickly pays for itself.

ABOUT THE DANISH ENERGY SAVING TRUST

The Danish Energy Saving Trust (Center for Energibesparelser) is expanding the activities of its predecessor and is now responsible for promoting savings for all forms of energy, excluding transport, in the household, public and public and commercial sectors. The Trust is an independent, public sector entity with its own Board appointed by the Minister for Climate and Energy. The Danish Energy Saving Trust was established on 1 March 2010 and is financed by a special energy savings charge of DKK 0.006/kWh payable by households and the public sector. Total annual proceeds amount to about DKK 90 million.

Making it easy to save energy

One of the Trust's goals is that it should be easy to save energy. One element of this goal is that the Trust is continually improving its Guidelines, and is developing new tools to make it even easier to choose energy efficient solutions.

New Head of Secretariat

Henrik Teglegaard Lund, the former chief tester of the Danish Consumer Council, was appointed Head of Secretariat of the Danish Energy Saving Trust on 1 July 2010, where he is responsible for the day-to-day efforts to promote energy efficiency in Denmark.

THE DANISH ENERGY SAVING TRUST'S TOOLS

Visit the Trust's website, use the tools, and contact our Customer Service Centre if you need help to get going.

Get help at www.goenergi.dk and www.savingtrust.dk

The Danish Energy Saving Trust's websites in Danish and English contain updated guidelines, tools and lots of information to help you on your way. In keeping with its new role, the Trust's Danish website has been expanded with new pages on heating and a completely new section targeted at industry and commerce.

Customer Service Centre advises on efficient use of energy

The Customer Service Centre is there to help with more detailed information about our websites and tools. Call or write to us for further information.

Tel.: +45 70 26 90 09

E-mail: goenergi@goenergi.dk

The websites provide information about:

- Guidelines and purchasing tools targeted at staff responsible for purchasing, and staff responsible for energy and IT.
- View Electricity Consumption (Se Elforbrug) that shows electricity consumption trends and allows users to analyse their consumption and compare key figures.
- Product overviews that make it easy to find products that comply with the purchasing requirements. The overviews cover products such as A-rated light bulbs, computers, network equipment, A-rated pumps, white goods and energy efficient equipment.
- Calculator tools for lighting, white goods, IT equipment and servers, which make it easy to prepare for the switch to more energy efficient solutions.
- Tables with electricity consumption data for ventilation systems in different public sector institutions.
- Information about different forms of heating, and which types are the most cost efficient in different situations.
- Advice on implementing behavioural campaigns supported by campaign material and online tools.

Tools and materials are being continually improved.

THE DANISH ENERGY SAVING TRUST'S COMMERCIAL KITCHEN GUIDELINES 2011

For all staff responsible for energy efficient design, purchasing and working practices in commercial kitchens.

Published by the Danish Energy Saving Trust. January 2011.

ISBN: 978-87-92080-76-9

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