# Operational optimisation measures for companies: Cooling

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# Consistently close up refrigeration and freezer units at night

Refrigeration units should be consistently “closed up” outside of opening hours. Night blinds, covers or glass doors are suitable for this purpose. The cold then stays inside the units and you avoid unwanted temperature fluctuations.

## Action

Make sure that all refrigeration and freezer units such as display cabinets, shelves, free-standing and promotional showcases are closed off from the room outside of opening hours (at night and at weekends).

## Requirement

You have freezer or refrigeration cabinets that are open to the room at night.

**When refrigeration units are closed up, they consume up to 30 percent less energy.**

## What to do

**1. Analyse the situation**

- Check which refrigeration units do not have night covers, sliding glass covers, night blinds or glass doors.
- Check whether existing covers and roller blinds are in working order. Have faulty components repaired, or replace them.

**2. Check out retrofitting**

- Ask your supplier for an offer to retrofit the refrigeration units with covers, (automatic) roller blinds or glass doors.
- Procure the appropriate covers.

**3. Employee training**

- Train your employees. Show them how to operate covers and roller blinds. Define who is responsible for closing them up and where the covers are stored during the day.
- Monitor daily implementation of these measures. If there are problems, clarify the causes (technical, logistical, time related) and attempt to eliminate them.

## Costs – effort

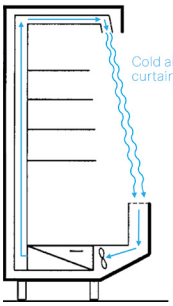
- Your own labour: approx. ½ to 1 day to inspect all covers and doors, including obtaining an offer (one time only)
- Night blinds for “plus” cooling cabinets cost approx. CHF 300 to 500 per metre.
- Covers for refrigerated counters cost approx. CHF 150 per metre.
- Additional labour for covering with manual roller blinds and covers: depending on the size of the shop, 5 to 10 minutes per day

## Please note!

- It always pays off to cover freezer units consistently.
- On freezer units, specifically check that the glass doors close tightly, and replace the seals if necessary.
- Glass doors always pay off when installing new refrigerated shelving units, or when replacing such units.

# Additional explanations

## Maintain the cold air curtain

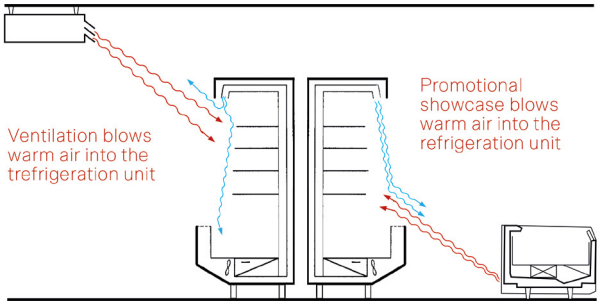


Source: RAVEL

If the cold air curtain of refrigeration units is disrupted, the temperature can no longer be guaranteed. This can negatively impact product quality and operating costs. It is therefore essential to keep ventilation slits free of goods and price signage. Also, the maximum stacking height in the unit must not be exceeded. It is best to apply marks showing how high products can be stacked.

## Avoid deviations from the required temperatures

Position mobile refrigeration units so that the warm air they give out is not blown into other refrigeration units. Also, units should not be placed in draughts, near air outlets of the ventilation system or in direct sunlight.



Source: RAVEL

## Switch off refrigeration units

After the shop closes, clear out and switch off all refrigeration units where you store products supplied on a daily basis. Ideally, refrigeration units of this sort should be equipped with a time switch. Programme the timer so that the units are switched on two hours before your business starts operating. Then, when you start work, you can immediately place the day's fresh new products in the units.

## Correct storage temperatures for products

Make sure that the products for sorting into the units are already cooled. Refrigeration units (special refrigerated display cases) are not suitable for cooling products down to the desired temperature. If a product is warm when it is placed in the refrigerated shelving unit, the temperature in the unit can no longer be guaranteed. Product quality may suffer as a result. Energy consumption and costs are also increased unnecessarily. For some products such as raw milk, pasteurised milk, cream cheese, cream, butter, meat and fish, the Federal Ordinance on Foodstuffs and Utility Articles stipulates maximum temperatures for storage and sale.

The following temperatures may be taken as guidance values:

**Open fresh products**
**(in staffed refrigerated counters)**
- Meat, sale: max. 5 °C
- Meat, storage: max. 2 °C
- Fish and similar items: max. 2 °C (storage and sale)

**Packaged products (self-service)**
- The maximum storage temperature is usually printed on the product package by the manufacturer.

**Deep-frozen products**
- Max. –18 °C (storage and sale)

## Retrofitting glass doors on refrigeration units

Retrofitting glass doors on existing refrigeration units (for milk, meat, fish, cheese, etc.) reduces their energy consumption by up to 30 percent. This corresponds to annual savings on energy costs of CHF 200 to 300 per metre. The costs of retrofitting are CHF 700 to 1500 per continuous metre of refrigerated shelving.

## Additional information

- Refrigeration and freezer units – 7 energy-saving tips for employees
- Successfully retrofitting glass doors on "plus" cooling cabinets
- Federal Ordinance on Foodstuffs and Utility Articles (SR 817.02)

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# “De-ice” cold stores and deep-freeze rooms, and keep them dry

Is ice forming on the surfaces of your deep-freeze room or on the evaporator? Are you noticing excessive condensation forming in your cold store? Both these phenomena are signs of too much moisture in the room. In both cases, reduce the moisture input.

## Action

Check cold stores and deep-freeze rooms regularly to see if ice and/or water have formed, remove deposits and minimise the moisture input.

## Requirement

You have a deep-freeze room or cold store (solid construction), or a cold-store cell or deep-freeze cell (room-in-room).

**Reducing the temperature in a cold store or deep-freeze room by one degree C increases the energy costs by three percent!**

## What to do

**1. Inspect the room**

Check regularly to see whether any condensation or ice has formed in the cold store or deep-freeze room, or on the evaporator. Find the cause:

- Does the door seal tightly? Check the seals and the closing mechanism.
- Is there any unwanted input of moisture – from open or warm products, for example?
- Can the cold air circulate freely in the room? (See overleaf)

**2. Rectify faults**

- Replace faulty seals and closing mechanisms. Wipe up the condensation and remove the ice by defrosting or using a deep-freeze cleaner.
- Find out what refrigeration temperature the products require and adjust the temperature to the actual requirements. When the type of usage changes, the old (lower) setpoint is often retained even though the temperature could be increased for the new usage.

Source: SSP Kälteplaner

## Costs – effort

- A door sealing profile costs between CHF 10 and 20 per metre.
- Replacing the door-closing mechanism costs CHF 200 to 500. Replacing the entire door costs approx. CHF 2000.
- Your own labour: approx. ½ day. If large areas of the room are iced up and everything needs to be defrosted and cleaned: up to 2 days’ labour.

## Please note!

- Special deep-freeze cleaners are available for deep-freeze cells and deep-freeze rooms. They are applied to the layer of ice; they penetrate the ice and loosen it. Then you can detach and remove it, and dry the liquid condensation. After you remove the ice, you must look for the cause (why did the ice form?) and eliminate it.
- In cold stores accessed by pallet rollers or forklifts, there is an increased risk of damage to door seals. If necessary, bollards can be installed to protect the doors against damage.

# Additional explanations

## Check the cooler's location

For reasons of energy efficiency, coolers installed over the cold store door should be relocated away from the door area – it is best to position them opposite the door. This can also prevent condensation from forming in the future. In deep-freeze cells, the coolers should be fitted with an automatic defrost device that is set correctly.

## Correct temperatures

For some products such as raw milk, pasteurised milk, cream cheese, cream, butter, meat and fish, the Federal Ordinance on Foodstuffs and Utility Articles stipulates maximum temperatures for storage and sale. The following temperatures may be taken as guidance values:

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**Deep-frozen products**

Max. –18 °C (storage and sale)

## Unused cold stores, refrigeration cells and deep-freeze cells: switch them off!

Cold stores and refrigerated cells that are not required or in use can be switched off. The same applies to deep-freeze cells (room-in-room system) that can also be defrosted without problems.

## Unused deep-freeze rooms: increase the temperature

Deep-freeze rooms (of solid construction) that are not required or in use should never be switched off completely. Instead, increase the temperature of the deep-freeze room from –18 °C to –5 °C. This will already save you about 35 percent of the electricity consumption. Please note: If the cooling is switched off entirely, frozen water can thaw out in the walls of the deep-freeze room and accumulate in the floor. When the cooling is switched back on, the water freezes and there is a risk that the floor will rise and compromise the statics.

### Employee training

Employees should note these points:

- Don't leave doors open for long periods
- Consistently switch lights off
- Adhere to maximum stacking heights
- Do not place warm products into refrigerated storage
- Automatic door-closing systems must not be propped open manually (with a wedge, for example)
- Report defects (ice formation, condensation water, faulty seals, etc.)

(Also see: 7 energy-saving tips for employees)

## Ensure air circulation

Organise the stacking of products in the cold store so that the cold air can circulate freely. Make sure that products stored in corners and on the upper level are cooled adequately. To achieve this, adhere consistently to maximum stacking heights in the cold store. The air outlet from the evaporator/air cooler must never be obstructed or built over.

## Lighting in cold stores and deep-freeze rooms

Equip cold stores and deep-freeze rooms with LED lighting and motion sensors. LED lighting radiates far less heat and thus does not heat up the cold store unnecessarily. With motion sensors, you can ensure that the lights are on only when someone is present in the cold store – and switching off the lights is never forgotten. Alternatively, the lighting can be connected to the door opening mechanism. Make sure that the LED lamps and motion sensors used in deep-freeze rooms are suitable for the low temperatures.

## Additional information

- Cold stores and deep-freeze rooms, 7 energy-saving tips for employees
- Guideline on optimising refrigeration systems (with instructions on cleaning heat exchangers)
- Federal Ordinance on Foodstuffs and Utility Articles (817.02)

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