

## Energy Efficiency of Refrigerating Systems – Information No. 5

### Cold and Freezer Rooms: Energy-Saving Tips



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**With the following measures, we can reduce the refrigeration demand and our energy costs significantly.**

**Contribute your part!**



# Content

## Content

- 4 **Energy-saving tips**
- 4 Close doors, turn off lights
- 4 Adhere to stacking heights
- 5 Do not store warm goods
- 5 Raise the temperature in empty freezer rooms
- 5 Switch off empty positive cold rooms
- 5 Correct storage temperatures
- 6 Report defects
- 6 Control defrosting
  
- 7 **Additional explanations on the tips**
- 7 Close open doors!
- 7 Never switch off empty freezer rooms completely!
- 8 Optimize lighting in the cold room!
- 8 Set temperatures correctly!

## Energy-saving tips

### Close doors, turn off lights

Only open doors and gates briefly and never wedge them open – not even when stocking the cold room. Where work takes longer (e.g. during picking), the refrigerating system can be briefly switched to standby in order to prevent noise and cold drafts (the warning and safety functions remain active). Well-structured, systematic goods storage reduces the time you need to spend in the cold and freezer rooms.

When there is no-one left in the cold room, always switch off the light.

Where there is a frequent and extensive turnover of goods, high-speed doors (or at least strip curtains or air curtains to supplement the cold room door) should be provided in order to keep the cumulative door opening time to a minimum. Where there is more than one door per room, it can be useful to lock them against each other in order to prevent increased heat input caused by air flow.

### Adhere to stacking heights

Design and organize goods stacking in the cold room in such a way that the cold air can circulate without impairment, so that the goods stored in the corners and on the upper level are also sufficiently refrigerated.

Adhere consistently to the maximum stacking heights in the cold room. The air outlet of the evaporator/air cooler must never be blocked.

Room with  $>0^{\circ}\text{C}$  temperature with ceiling air cooler for increasing the stacking height





### **Do not store warm goods**

If the process allows it, allow warm goods to cool as much as possible before storing. Warm goods in different positions can have a big impact on the refrigeration temperature in the refrigerator or freezer and increase energy costs unnecessarily.

### **Raise the temperature in empty freezer rooms**

If the freezer room or freezer cell is briefly left empty, increase the temperature to  $-5^{\circ}\text{C}$  (see also “Additional explanations on the tips”).

### **Switch off empty rooms with $>0^{\circ}\text{C}$ temperature**

If the cold room is empty in the medium or long term, switch off the refrigeration. However, pay attention to room hygiene regularly.

In systems with several cold rooms, switch the empty cold room to standby.

### **Correct storage temperatures**

Set the correct temperature for the goods you are storing. Cold rooms containing a mix of products are set for the goods with the lowest temperature requirements for storage. You will find the required temperatures for the various products in the relevant directives and regulations. Technical books such as “Formeln, Tabellen und Diagramme für die Kälteanlagentechnik” by Breidert/Schittenhelm, VDE Verlag, are also helpful.

The storage temperature is the room temperature to be controlled (= temperature of the air flowing back to the evaporator/air cooler).

## Report defects

Report any defects you notice to the person responsible for the refrigerating system and the cold room. These might include the following:

- Defective door seals
- Defective closing mechanisms on the door
- Ice/frost/snow on the walls and evaporator (cooler)
- Ice or puddles on the floor (safety)
- Droplets on the walls or floor
- Unusual or loud noises from the fans

## Control defrosting

Check the defrost time as a ratio to the refrigeration time at each refrigeration point. It should not be higher than 7%. 2-3% is ideal.

Check the defrost temperature: The icing around the evaporator/air cooler shown below is caused by a final defrost temperature that has been set too high (see also “Additional explanations on the tips”).



Ice on ceiling and wall

The icing around the evaporator/air cooler shown is caused by a final defrost temperature that has been set too high.

## Additional explanations on the tips

### Close open doors!

Through open doors warm, humid air can pass into the cold room. In freezer rooms, the humidity in the air condenses and ice, frost and snow can deposit on all the surfaces in the room (walls, floor, ceiling, goods, shelving). This is an indication that e.g. doors and windows are left open too often and too much humidity therefore enters the room.

For energy reasons, coolers installed above the cold room door should be moved away from the door area (ideally to opposite the door).



Cooler in a sausage ripening room

### Never switch off empty freezer rooms completely!

Because of the large temperature differences, repeatedly heating and cooling freezer rooms puts a great strain on the building, especially the room joints, and must therefore be avoided.

Care must also be taken if the freezer cell floor is cracked or the floor or wall joints are damaged. Never switch the refrigerating system off completely, but keep the room temperature under 0°C. Otherwise, frozen water can defrost in and on the enclosure of the room and collect in the cracks in the floor. When the freezer room is switched back on, the water freezes again and damages the wall and floor.

Another risk is the formation of ice under the cold room floor, which can damage the building's support structure. Functional frost heave protection prevents this. From an energy point of view, heating operated with waste heat should be preferred to electric heating.

Increasing the temperature of unused freezer rooms from -18°C to -5°C results in an energy saving of around 35%.

## Optimize lighting in the cold room!

Switch off the light in the cold room as soon as you leave it. Talk to the person responsible for refrigeration about whether it makes sense to retrofit a movement sensor with time delay. This device switches the light on and off automatically on demand.

LED lights are ideally used in cold and freezer rooms today. The advantage of LED technology is that it provides the full lighting power immediately, while its high efficiency means that it radiates less heat.

## Set temperatures correctly!

Products and goods that are refrigerated at lower temperatures than required unnecessarily increase the energy demand and operating costs.

Set the temperature as high as possible and as low as necessary. Regulations such as the EC 37/2005 prescribes temperatures for various foods.

Depending on the product, chest type and other frozen food cabinets can be refrigerated to -18°C. Cooling to -24 °C requires around 30% more energy.

**Energy costs increase by 5% for every degree of temperature reduction!**

### Important

**Staff safety: It must be possible to open cold rooms under zero degrees from inside and outside at all times.**

**See DIN 8986 for further requirements.**

You can find further information on the topic of energy saving in refrigerating systems in the "Guideline with Measures for Optimizing Refrigerating Systems".

You will find more information on energy and cost efficiency at [www.kwt.vdma.org/Energieeffizienz](http://www.kwt.vdma.org/Energieeffizienz).

## The guideline “Cold and Freezer Rooms: Energy-saving Tips”

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- sensitizes planners, installers and operators of refrigerating systems to the topic of energy efficiency and helps to enhance their skills.
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