



COMFORT GUIDE: MARINE COOLBOXES AND FRIDGES

El sistema de gestión de calidad de DAHLBERG S.A. obtuvo su aprobación original ISO 9001 el 18 de octubre 2003, el cual se ha mantenido en vigor hasta la fecha, aprobado por **Lloyd's Register Quality Assurance España S.L.U.**, de acuerdo con la Norma de Sistema de Gestión de Calidad **ISO 9001:2015**. Esta certificación está avalada por **UKAS Management Systems**





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1. INTRODUCTION

With this guide Dahlberg S.A would like to give you advice and some key points to consider when purchasing a refrigeration system.

We will present you the main features of both electric and passive portable coolboxes and explain in detail the differences between absorption, compression and thermoelectric cooling.

As a Diamond Premium Distributor we have the knowledge to help you to choose the right portable coolbox or fridge depending on your needs. If you have any questions or would like to find out more, please get in touch with us.

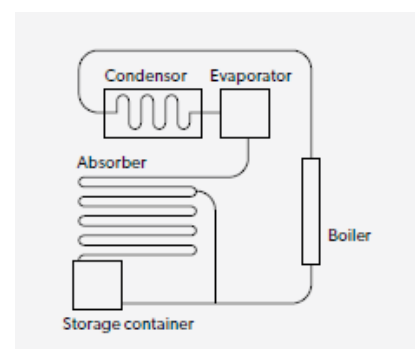
2. ELECTRICAL COOLBOXES

If you have access to a power source, and you plan on being away for an extended period of time, we advise you to choose one of the electrical coolboxes. Compatible with almost all onboard mains power supply, they can be used all over the world. Depending on where you will be staying, you can choose between three different cooling technologies: thermoelectrics, absorption or compressor.

Each one of them has specific advantages that make them ideal in certain conditions. The key features of each are:

a) Absorption technology

"A solution of ammonia and sodium chromate is heated in a boiler where the ammonia distills from the water, evaporates and travels to a condenser where it liquidizes. When hydrogen gas is added to the liquidized ammonia in the refrigeration unit, the solution evaporates again and in this process extracts heat from the refrigeration unit. At the end of the process the ammonia is absorbed by the water, flows to the boiler and the process start again."



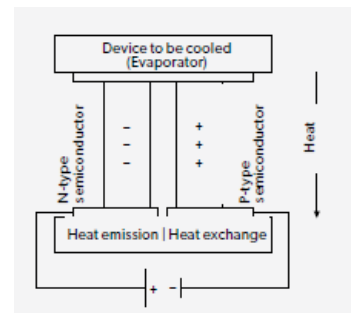
The absorption coolboxes are known for their functionality as they work with alternating as well as direct current, and when used outside the boat, also with a portable gas cylinder.

They operate completely silently, and have a cooling capacity up to 30 degrees below the ambient temperature.



b) Thermoelectric technology

“The principle of thermoelectrics was discovered in 1834 by J.C.A. Peltier, therefore the heating elements of thermoelectric systems are called elements of Peltier. The thermoelectric systems are based on the principle that when a constant current is flowing between two types of metal, depending on the polarity either heat or cold is generated. The heating or cooling power can be increased through heat exchangers or ventilators. This is ideal for small or medium cooling requirements.”



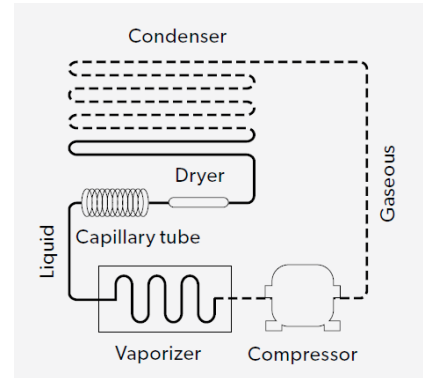
The thermoelectric systems are low cost and lightweight, and work well also when the boat is heeled over. They are typically heavily dependent on ambient temperature making them an ideal solution for cooler or temperate climates, but certain DOMETIC thermoelectric models are an exception to the rule, cooling down to 27 degrees below the ambient temperature.

The thermoelectric coolboxes are lightweight and apart from cooling, they also have a heating function up to +65 degrees.



c) Compressor technology

Compressor cooling systems operate with a refrigerant that converts from liquid state to gas in a capillary tube and flows into a vaporizer. The resulting evaporation extracts heat from inside the refrigeration unit and the inside temperature drops. The refrigerant then passes to a compressor, where it is compressed and transferred to a condenser. There, the absorbed heat is liberated to the atmosphere and the refrigerant liquidizes again, starting a new cycle.



If you are going to navigate extended periods of time in warmer climates, it is preferable to take advantage of the powerful refrigeration capacity of the compressor technology, and also have the option to freeze your food regardless of the ambient temperatures.

The compressor coolboxes can be operated also with solar energy.





3. HOW TO CHOOSE THE BEST PORTABLE COOLBOX

a) What size should your cooler be?

Consider the amount of storage space available in your boat, the number of people who will be dependent on the cooler and the duration of your voyage. If you are not planning to return to port for a while, you should consider a larger coolbox, bearing in mind that they consume more energy.

b) What energy sources do you want to use?

The absorption coolboxes are the most convenient as they run on AC, DC (12V / 230 V) and outside the boat, even on gas.

On the other hand, the compressor coolers are ideal for solar power due to their low energy consumption. Solar energy is a cheap and clean option. The compressor coolers run on 12 V / 24 V / 110 V – 230 V.

The thermoelectric coolers can be run only on alternating current.

c) Energy efficiency

The efficiency is also important. Any cooler that runs on mains electricity must, by law, be rated for its efficiency.

DOMETIC has set a new efficiency benchmark for compressor coolers, their CFX range is the first cooler to achieve an A++ rating.

Their thermoelectric coolers also consistently achieve up to A+++ rating.

Absorption coolers are not obligated to the energy labelling because they are mainly used on gas.





d) Achieved temperatures

It is important to consider the type of climate you'll be in, the conditions of the voyage and its duration.

Thermoelectric and absorption coolers will cool between 18-30 °C below the ambient temperature. Clearly, this may not be adequate if you are travelling in a region where temperatures reach 40 °C or more.

During voyages of few days or a week, an absorption cooler is more than sufficient. Some models even allow keeping ice cubes inside the fridge compartment.

A thermoelectric coolbox keeps contents cool, rather than cooling them itself. It's therefore necessary to pre-cool items before placing them inside a thermoelectric coolbox. It is best suited for bringing along snacks, food and drinks from home instead of buying them on the road, and thus not so practical if you are dependent on it for more than one or two days.

If you are planning longer trips or destinations where temperatures rise above 40, we recommend you to choose a compressor coolbox, as they are very powerful and can provide an excellent cooling performance, even at extremely high ambient temperatures.

According to model, the temperature can be pre-adjusted within range from +10 °C to -20 °C.

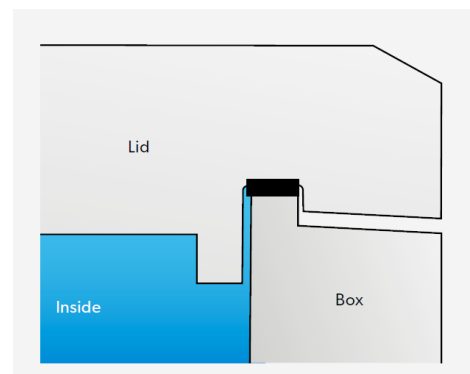
4. PORTABLE PASSIVE COOLBOXES

The passive coolboxes provide a key advantage: they don't need an energy source. Instead, they have a highly efficient polyurethane foam insulation, combined with a hermetic labyrinth seal. Once the cool packs or ice cubes have been placed inside, the contents of the coolbox will stay fresh for days, depending on the use and weather conditions.

They are the best portable fridges for fishing as they are equipped with a very effective and resistant insulation: put ice cubes in them and they will keep food fresh. The ice will last several days, depending on usage and weather conditions.

If you will be away for long periods of time, the best alternatives are the roto-moulded portable passive coolboxes. While the simpler passive coolboxes can maintain ice intact for a couple of hours, the roto-moulded coolboxes can stay cold for days. This is due to a higher level of insulation provided by the roto-moulding technology. An insulation box minimizes the amount of air going in the coolbox, allowing this sort of portable coolbox to stay cold for a long time.

Owing to their insulation system, the roto-moulded portable coolboxes can maintain the contents not only cold, but also warm. Although not designed to warm up cold food, they can conserve food preheated up to 65 °C and maintain it warm.



5. COMPARISON OF THE PORTABLE COOLBOXES

	ABSORPTION	THERMOELECTRICS	COMPRESSOR
Energy source	12 V / 230 V / Gas	12 V / 24 V / 230 V	12 V / 24 V / 110 V – 230 V
Exterior temperature	40 °C	40 °C	40 °C
Achieved interior temperature	From 20 °C to 10 °C according to model	From 20 °C to 10 °C according to model	Pre-adjusted temperature within a range of 10 °C to -- 22 °C according to model
Size	31 l - 40 l	8 l - 37 l	10,5 l - 88 l
Noise level	Completely silent	Continuous fan noise	Occasional, quiet running



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ABSORPTION

- Gas powered cooling allows travel off-grid
- Silent operation
- Cooling performance depends on the ambient temperature

THERMOELECTRICS

- Low purchase cost
- Lightweight
- Performs well in inclined position
- Typically heavily dependent on ambient temperature, but the unrivalled cooling power of certain DOMETIC thermoelectric models break the mould

COMPRESSOR

- Excellent cooling even in extreme ambient temperatures
- Powerful cooling enables refrigeration and deep-freezing
- Low power consumption
- Performs well in inclined position
- Suitable for solar operation
- Integrated battery protection

PASSIVE COOLBOXES

- Don't require an external power source
- Maintain food fresh during several days, depending on the ambient temperatures
- Highly efficient polyurethane foam insulation, combined with a hermetic labyrinth seal
- Easy to clean
- Optimum volume/weight ratio

See attached a function table for each type of cooler:

COOLING SYSTEM	
Passive cooling	Insulating effect depending on the ambient temperature
Absorption technology	Refrigeration depending on the ambient temperature, ice cubes on the evaporator
Thermoelectric technology	Refrigeration depending on the ambient temperature
Compressor technology	Refrigeration and deep-freezing from +10 °C to -22 °C (CFX)



6. NAUTICAL FRIDGES

The choice of fridge is very personal and depends very much on the size of the boat. Dahlberg S.A recommends you to have a look at the wide range of options provided by DOMETIC, from drawer fridges to fridge/freezers in a combined unit for the bigger boats.

In the following we give you some advice for the election, maintenance and efficient use of the fridge onboard.

- **TURN EMPTY SPACES INTO A FRIDGE:** with a high performance compressor drawer boat fridge, you can make use of small spaces. It's cooling unit can be installed separately and therefore provides flexible positioning options.
- **BLOCKING SYSTEM:** with the motion of the waves rocking the boat, the fridge door can be locked securely with an innovative, patented dual locking system which acts also as a vent for an improved cooling performance.
- **TIGHT SPACES:** some boat fridges have a detachable cooling unit which allows it to be mounted in another space, offering thus an increased installation flexibility.
- **WIDE SPACES:** if you have room onboard, you can choose a combined fridge/freezer. The separate fridge and freezer compartments are accessed by their own door.
- **SOLAR ENERGY:** marine fridges and freezers with an option to be powered by solar energy allow you to save energy and money as well as care for the environment. Using solar energy also ensures that you won't drain the boat's battery.
- **CLOSE THE BOAT FRIDGE PROPERLY:** some boat fridges have features, such as magnetic seals, to ensure the door closes firmly. However, it's important that you check the condition of these seals regularly to make sure they are effectively holding the cool air inside your fridge.
- **DO NOT OVERLOAD:** for optimal cooling, cold air needs to circulate effectively. If the fridge or freezer is packed full with food and drink, the flow of air will be restricted.
- **TURN THE FRIDGE ON THE DAY BEFORE:** by turning your boat fridge on the day before you depart, you can ensure that the fridge is optimally cooled. We recommend doing this during the night when the ambient temperature is cooler, as it will reduce the amount of time and energy it takes to achieve your desired cool temperature.



Fuentes:

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- Dometic

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