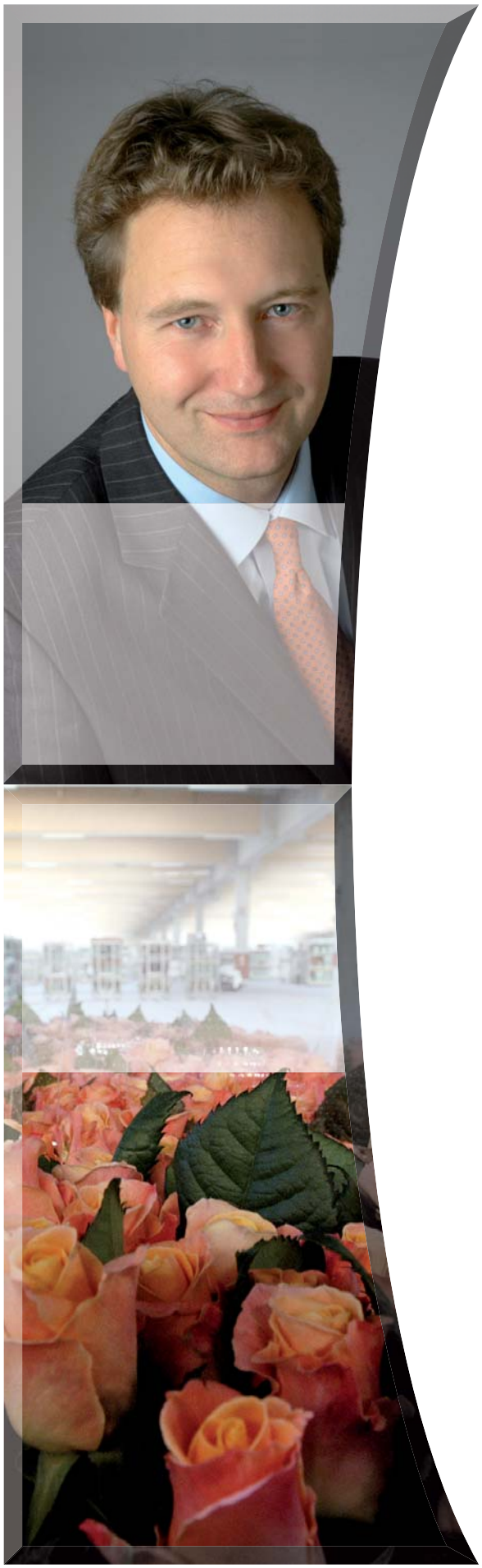
Küba Blue Line
Freshness that lasts longer

Price: 10,- EURO

Suitable for CO_2/NH_3

Küba Blue Line
Aircoolers



Welcome to the world of Küba!

It´s my pleasure to introduce the new Küba Blue Line catalogue. The overwhelming positive response to our Green World catalogue persuaded us to move in new directions with our Küba Blue Line as well.

Based on the motto, „the right air cooler for the application", we have completely restructured the catalogue for you, integrating all of the models in the Küba Blue Line.

In our new section on applications (p. 16, ➢ Applications) we introduce selected refrigeration tasks and the corresponding Küba „Blue World" solutions. Here we present particular challenges for slaughterhouses, for fruit and vegetable storage, for deep freeze applications, etc.

To guarantee that the value of cooled goods is preserved and enhanced through storage and refinement, Küba's goal is to ensure the sustainable commercial success of refrigeration system operators.

The key to achieving this goal is Küba's specific understanding of applications, which we use **to transform the challenges they present into refrigeration technology.** That's why Küba is the market leader in refrigeration technology expertise regarding Air Coolers (p. 10 ➢ Küba).

Yesterday, today and tomorrow we continue to **set quality standards worldwide** (p. 8 ➢ Quality). The legendary „Küba evaporator 68" is the reference air cooler with which air cooler test rigs have been set up and calibrated since 1968. It provides the basis for the European norm EN 328 and the EUROVENT testing specifications, to which Küba engineers made significant contributions.

For Küba, quality means always providing the maximum benefit for our customers, so we focus on best technology for the application, not the technology itself. Continuously improving our products and our internal processes and production methods are in the heart of our understanding of who we are.

So that these benefits are also available to refrigeration system operators, we work closely with our partners in refrigeration wholesale and refrigeration system construction. In this way, that which belongs together can come together: Expertise in application, planning and system construction.

To provide orientation for our partners in their selection of the optimum air cooler, the product programme is presented by application. With two complete product lines we offer you the right high performance air cooler for highly complex or very simple cooling tasks based on cooling technology for commercial or industrial use.

Editorial

The Küba Green Line offers the right products for simple refrigeration applications. With a clear focus on standardised refrigeration tasks, the Küba Green Line combines low investment and operating costs with proven Küba quality.

The Küba Blue Line offers the best technical solution for complex refrigeration applications. The Blue World stands for maximum goods protection, optimum maturing or finishing processes and universal use, even in difficult environmental conditions.

Do you have a **complex refrigeration task in a small space?** Then our high performance ceiling evaporator, the Küba DE *professional*, is the right choice (p. 32).

Precision in the cold storage room has a name: Küba SG *commercial*. It sets the worldwide standard for all high performance Air Coolers in cold storage and deep-freeze areas (p. 42).

The „Swiss Army Knife" of Air Coolers is the **Küba SG *industrial*.** No matter how high the power demand, the **Küba SG** *industrial* masters the most complex refrigeration tasks (p. 66).

In the Blue World, we have completely reworked the **Küba SF *blastfreezer* for shock freezing**. You benefit from more output with less energy input (p. 98).

In **large production and working rooms,** such as slaughterhouses and dairies, our dual discharge **Küba DZ *production*** feels right at home, and the people who work there feel comfortable too (p. 108).

At the end of the catalogue is an **informational section** (p. 128) where we provide details regarding general topics, such as an overview of the models, corrosion prevention, noise, etc.

Enjoy your exciting journey through Küba's „Blue World".

Welcome!

Christoph Korinth
Technical Manager

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Küba

DE *professional*

SG *commercial*

EUROVENT CERTIFIED PERFORMANCE "CERTIFY ALL" Air Coolers

Küba Blue Line
Freshness that lasts longer

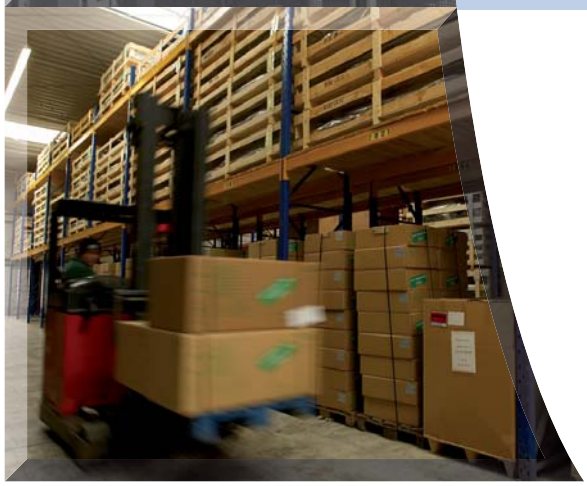
Küba Blue Line
Aircoolers

Küba stands for

- Continuity

- Quality

- Optimum solutions



- Service and availability

Küba stands for continuity:

Küba represents tradition and progress – and **8 decades of dedication to refrigeration technology.** Since 1927, Küba has developed and manufactured its products in Germany, **setting worldwide technological standards with quality „Made in Germany".**

Specialisation and continuous investment in research and development (R&D) and optimised production processes make this **consistent top performance** possible.

Küba stands for quality:

Among air cooler manufacturers in Europe, Küba has the largest R&D facility, which provides the driving force for technical advancement and innovation **in both individual components and across all products.**

The acid test of the unrivalled functionality and quality of Küba products, however, is their **daily use in thousands of practical applications.**

The result is **maximum safety** in terms of **installation, use and maintenance** as well as in the long-term **value of the investment.**

Küba stands for optimum solutions:

A consistent focus on our customer's needs is the driving force for **innovative product solutions.**

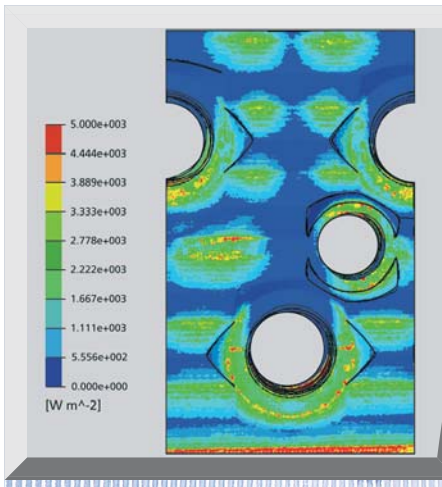
The measuring stick is always achieving the **maximum customer benefit,** not reaching the ultimate pinnacle of technology.

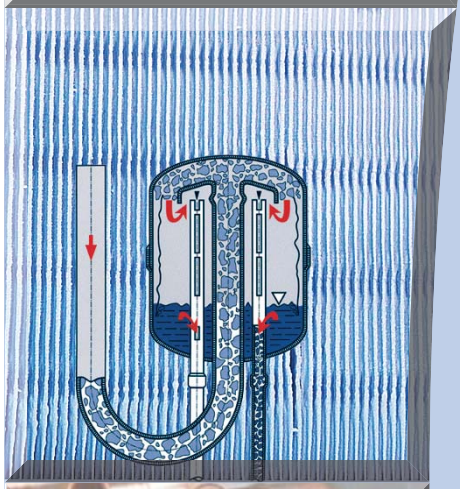
With the **Küba Blue Line** and the **Küba Green Line,** Küba is the only manufacturer to offer **two complete, comprehensive air cooler product lines.**

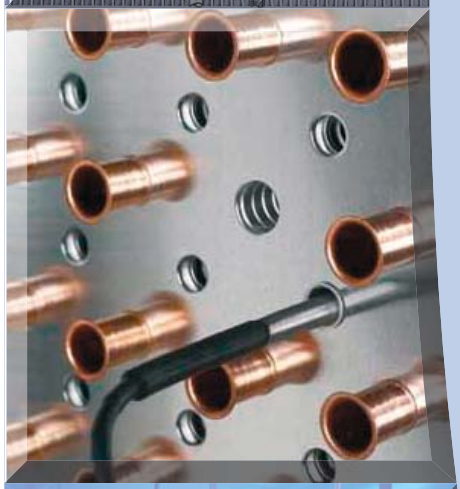
Küba stands for service and availability:

Of course, customer focus à la Küba also means offering extensive technical and **sales-oriented service whatever the situation.** Above all, this includes **ease and accuracy in selecting** products, accessories and spare parts.

An extensively stocked warehouse at the Baierbrunn site near Munich guarantees **rapid availability** (24 hour delivery) and provides additional **reliability for operation, planning and scheduling.**







The Küba HFE® tube / fin system for maximum energy efficiency

Extensive, ground-breaking research and innovative testing methods have lead to the development of a tube / fin system that offers an optimum combination of maximum heat transfer with minimum loss of pressure.

- Optimised k-value for **high refrigeration capacity**
- Fan requires **low energy input** thanks to low air resistance
- **Long operating periods** due to minimal frost build-up
- **Compact devices** with high capacity

The Küba CAL® distributor for optimum refrigerant distribution

Küba Air Coolers for direct expansion with multiple injection are equipped with the patented Küba CAL® distributor.

- **A consistent performer across the entire application spectrum, the Küba CAL® distributor always works at the optimum capacity**
- **Complete, consistent refrigerating capacity at all times**, regardless of refrigerant and ambient temperature
- **Maximum energy efficiency even in partial-load operation,** thanks to even refrigerant distribution
- **Universal flexibility** from +40 °C bis -55 °C

Optimal defrosting for all applications

Based on the overall concept of the refrigerating plant, any of the established defrosting methods can be used. For brine and hot gas defrosting, the tube circuitry is optimized for the specific application. For electric defrosting, expanded heater tubes achieve the optimum connection to the fin.

- **Energy transfer with almost no loss**
- **Shorter defrosting periods** due to lower final defrosting temperature in the heat exchanger
- **Minimal vapour build-up** due to low surface temperature on the heater tube (< 95 °C)

Best material selection and processing

Küba Air Coolers have lasting corrosion protection and are not overly sensitive to cleaning procedures, thanks to their scratch-resistant surface.

- We use the **best materials and high-quality components** for each application because high product quality starts in purchasing
- **Perfect surface finish**, e.g. with a food safe, non-polluting powder coating that is applied before assembly: corrosion protection even for inaccessible components

Highly cost-effective

Choosing Küba Air Coolers is the right decision for ecologically, economically oriented investors.

- Because our components are fine-tuned to coordinate precisely with each other, Küba Air Coolers are highly efficient. We take advantage of all energy saving potential for sustainable **reductions in operating costs**
- Selecting the best materials and high-quality processing are the basis for **long service life** and provide the **best protection for your investment**

Maximum goods protection

All Küba Air Coolers rely on Küba quality to offer optimum goods protection for the respective refrigeration application.

- Absolute security regarding the temperature of the goods and the room
- **Minimal dehumidification** of sensitive cooled goods so the „freshness lasts longer".
- **Perfectly adjusted air distribution** – from a powerful air flow to gentle cooling

Hygienic and operational safety

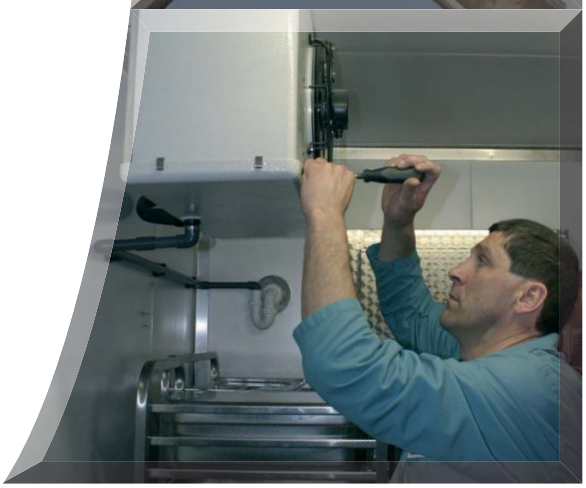
When you're dealing with food, hygiene is essential and for operators, it is legally prescribed, e.g. the HACCP guidelines.

- Material selection and surface finish such as the powder coating **meet the requirements of food and consumer product legislation**
- Of course, **it's simple to clean Küba products. Often drip trays with downward fold-out hinges are standard; hinged fans on request**
- **Long-lasting corrosion protection** facilitates hygiene in the cold storage room

Optimum installation and maintenance

The design of Küba Air Coolers places great emphasis on quick and easy assembly and maintenance.

- All significant component groups are **easily accessible**
- We **prevent injuries** with the powder coating and by avoiding the use of sharp edges
- The smaller Air Coolers **can be installed right out of the package by just one technician**



The impact of goods on refrigeration

Complex cooled goods

The complexity of cooled goods increases when dealing with unsealed or exposed goods that are highly sensitive to dehumidification, e.g. fruits, vegetables, flowers or baked goods. The same applies when improvement processes are taking place, as in the ripening of cheese or bananas. Complex cooled goods also include meat and fish as well as acidic products such as marinades and tropical fruits.

Simple cooled goods

Maintaining humidity and air velocity also influences the quality of cooled goods to a limited extent. Simple cooled goods include above all packaged goods and beverages.

For all companies that process fresh foods, allow them to ripen or store them, refrigeration has a great impact on their economic success. The focus is always on the cooled goods.

Environmental impact

Complex environment

People at the site and their usage patterns create a complex environment. If doors are opened frequently or for long periods, the cold storage room can be subject to high levels of humidity. Long periods in storage or the use of aggressive cleaning agents as required for meat or fish processing also increase the degree of complexity.

Simple environment

The environment of the application is the second factor in selecting the right Air Cooler. Constructional conditions may necessitate an air cooler with a long air throw, low profile design or special accessories.

High performance Air Coolers from Küba offer optimum goods protection and the perfect support for finishing processes to guarantee that the value of your cooled goods is preserved and enhanced.

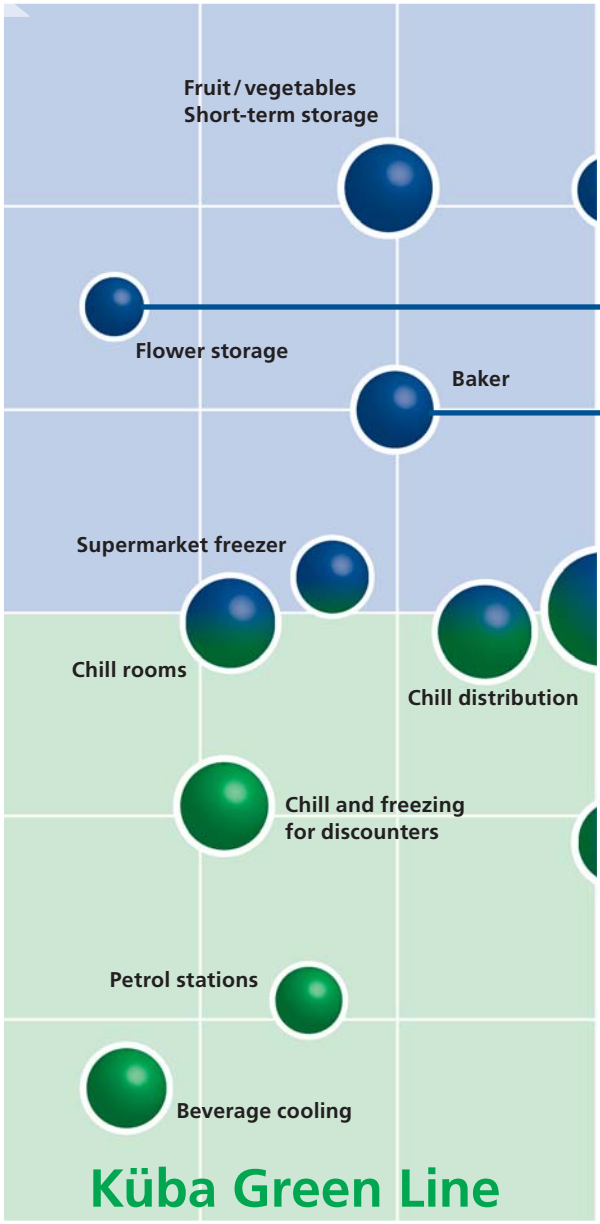
The degree of complexity created by both factors, the cooled goods themselves and their environment, determines which line of Küba Air Coolers offers the right products.

Complex refrigerated goods

What counts here is precision in maintaining temperature, humidity and air speed; demanding cooled goods

Simple refrigerated goods

Precision in maintaining temperature; less demanding cooled goods



Complex goods
Simple environment
Küba Blue Line

Simple goods
Simple environment
Küba Green Line

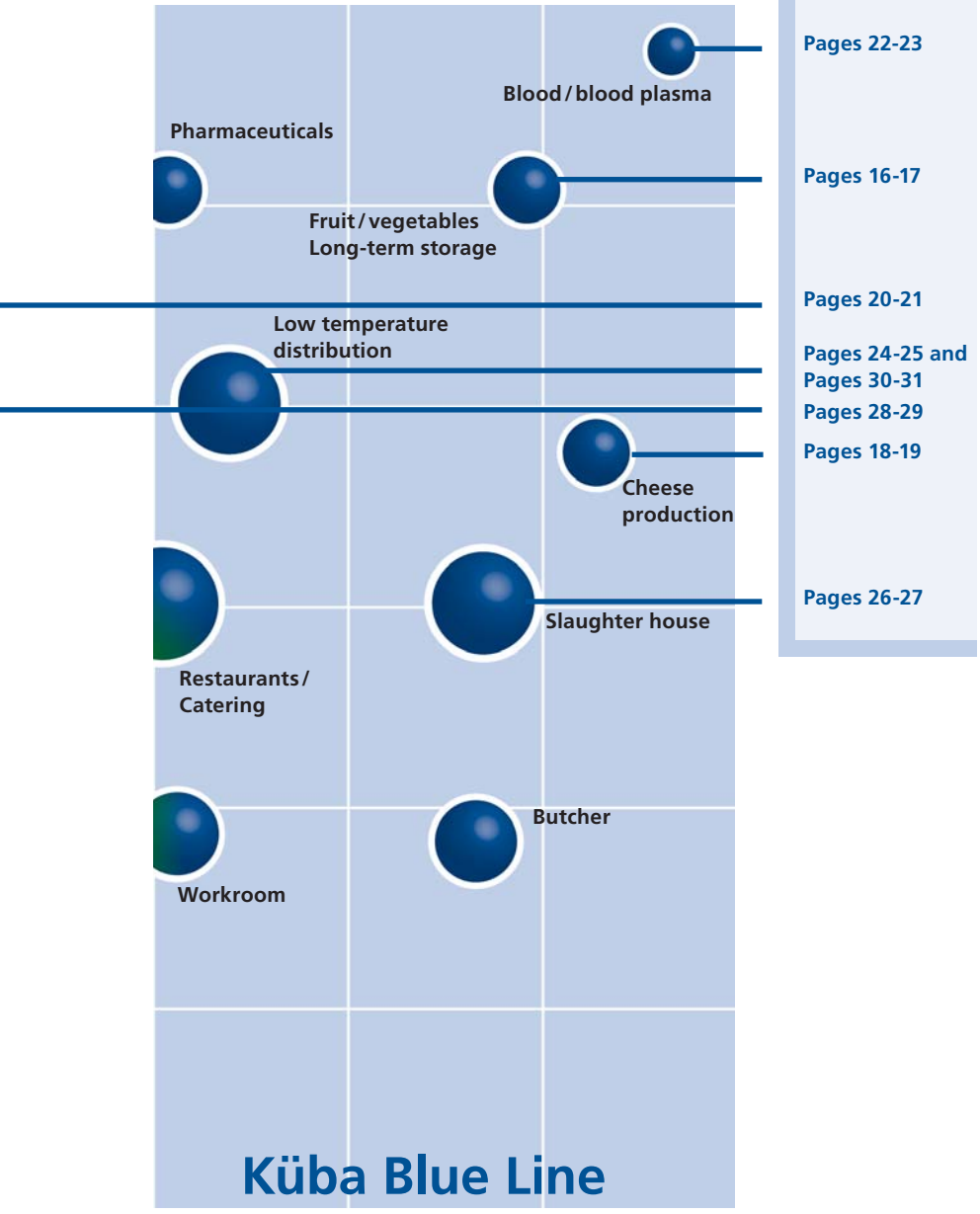
Simple environment

- Simple refrigeration
- Short-term storage
- No aggressive cleaning agents

- **The „Green World“: the Küba Green Line for simpler applications.**

The decision: Blue or Green World

More information is available on the following pages:



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Pages 30-31
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Pages 18-19
Pages 26-27

Complex goods
Complex environment
Küba Blue Line

Simple goods
Complex environment
Küba Blue Line

Complex environment

- Long-term storage
- Aggressive cleaning agents
- Specific air distribution requirements
- High traffic load
- High humidity input

- **The „Blue World“: the Küba Blue Line for complex applications.**

Küba Green Line

***gastro* FM**
Q_0 up to 0,33 kW

***junior* DF**
Q_0 up to 2,1 kW

***compact* DF**
Q_0 up to 10 kW

***market plus* SP**
Q_0 up to 50 kW

***comfort* DP**
Q_0 up to 28 kW

Küba Green Line
simple reliable fresh

The right product line for simple cooling applications.

With a clear focus on standardised refrigeration tasks, the Küba Green Line combines low investment and operating costs with proven Küba quality.

Please also see our separate Green Line catalogue.

Küba Blue Line

Küba Blue Line
Freshness that lasts longer

The best technical solution for complex cooling applications.

The Küba Blue Line stands for maximum goods protection, optimum ripening or finishing processes and universal use even in difficult environmental conditions.

DE *professional*
Q_0 up to 9,4 kW

DE starting on page 32

SG *commercial*
Q_0 up to 32 kW

SG.C starting on page 42

SG *industrial*
Q_0 up to 170 kW

SG.I starting on page 66

SF *blastfreezer*
Q_0 up to 64 kW

SF starting on page 98

DZ *production*
Q_0 up to 78 kW

DZ starting on page 108

Fruits & Vegetables

In parts of the world where the cultivation and harvest of **fruits and vegetables** depends a great deal on the seasons, optimum long-term storage is a complex refrigeration task.

The cooled goods

For **maximum preservation** of value, fruit and vegetables must be stored at a temperature and humidity determined individually for each variety;
e.g. root/leafy vegetables at ± 0°C,
Humidity: 85 - 95%
Apples at +1°C to +4°C,
Humidity: 92 - 95%.

Minimal dehumidification is important to ensure the least possible lost of weight and quality. After dehumidification of more than five percent, lettuce cannot be sold.

To counteract fungal decay and putrefaction, **good air ventilation** for the cooled goods presents another central challenge to be mastered.

The environment

In **long-term storage**, the initial storage phase is differentiated from the storage period.

Initial cooling phase:

In this phase **large quantities are chilled within a short period**. The field heat must be removed from the product and its temperature reduced to the level appropriate for storing it. Correspondingly, the demand for power is high. To avoid the formation of heat pockets and to cool the entire storage chamber evenly, a high degree of air circulation is required.

Storage period:

Once the proper storage temperature for the refrigerated goods has been achieved, only the heat from respiration and transpiration must be removed. The demand for power decreases sharply and **energy efficiency** takes on a central role.

Our solution: The Küba SG *commercial* and Küba SG *industrial*

The Küba SG *commercial* and SG *industrial* are best suited for the wide variety of requirements in both the initial cooling phase and the storage period. They ensure maximum preservation of value by allowing minimal dehumidification of the fruits and vegetables in storage.

To preserve as **much value as possible**, the dehumidification of the produce must be minimised as it is cooled. The degree of dehumidification of the cooled goods depends above all on the difference (DT1) between the evaporation temperature of the refrigerant and the air inlet temperature into the air cooler. The smaller this difference, the less moisture is removed from the cooled goods. **The produce retains it natural appearance and its taste as well as its value.**

Quick cool down in the initial cooling phase:

Optimal air circulation in the storage chamber and a **few brief defrosting phases** are the keys to a **quick, even chilling process.** The standard air guiding grid used in the Küba SG achieves optimum ventilation of the space. This avoids the formation of heat pockets that can reduce product quality.

Maximum preservation of value during the storage period:

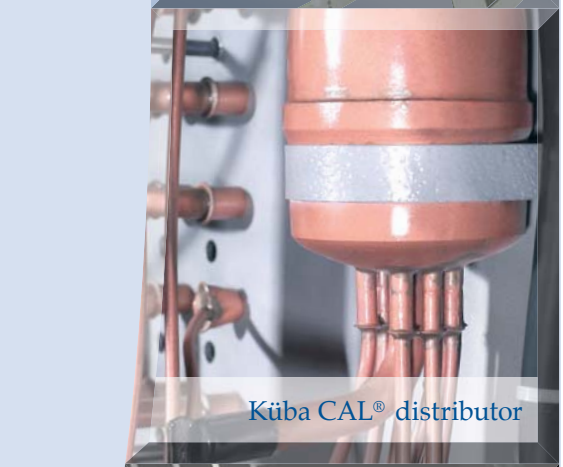
Cooled goods in both simple cold storage and storage with a controlled atmosphere (CA storage) require an appropriate air speed during the storage phase due to their sensitivity and low need for cold temperatures. The Küba SG models feature fans with speed controllers which can be adapted precisely for your specifications and set for the required air circulation in the storage chamber (air exchange rate). For example, for fruits with stones, the air must be exchanged 15-25 times per hour, and for most types of vegetables about twice as often. But only the correct stacking method ensures even air flow and uniform temperature in all areas of the storage chamber.

The second factor that impacts the storage phase is **humidity**. If it is too high, parasitic infestation can occur; if it is too low, the produce dries out. Both reduce quality. The solution is keeping the **temperature difference (DT1) to a minimum**. This requires that **the fins have very even folds**. The patented **Küba CAL® distributor** together with the **highly efficient Küba HFE® tube/fin system guarantees a minimum difference even in the partial-load range.**

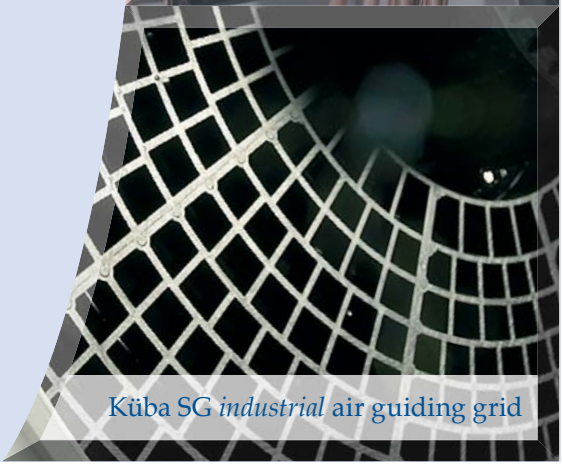
Because these applications often run at temperatures below the dew point, we recommend the **double insulated drip tray.** It ensures that condensation water does not reduce product quality or create an accident risk.

Küba SG *commercial*

Küba SG *industrial*



Küba CAL® distributor



Küba SG *industrial* air guiding grid

Cheese

Worldwide there are more than 3,000 types of **cheese**, making it one of the most important foods produced from milk. Its physiological, nutritional value, based on its contents ingredients (amino acids, minerals, trace elements, fat-soluble vitamins, etc.) is unsurpassed. After a short production phase, its financial and edibility value is added primarily during the aging process. In addition to storage, this task represents a complex refrigeration challenge.

The cooled goods

The cooling requirements for cheese depend on the production process and are often complex.

During aging and storage, the **temperature must remain within the precisely defined range**. The tolerance is sometimes just 0.5 to 1K.

Many types of cheese, e.g. Camembert, a white mould cheese, require **high humidity for an optimum aging process** and to develop its characteristic taste.

One challenge the air cooler faces is related to the **numerous corrosive substances** that the cheese releases as a result of chemical reactions in production and in the aging process.

The environment

The environmental conditions change depending on the production step.

Hygiene plays a significant role in the initial steps of turning milk into cheese. Particularly the **corrosive substances found in cleaning agents** make this environment complex.

If people are involved in the cheese production, these working areas must naturally meet the **needs of the employees** on site.

Although **air movement must be kept to a minimum**, the temperature level in the aging and storage areas must be uniform, so that all of the cheeses ripen evenly. At the same time, particular attention must be paid to the **precise maintenance of humidity levels.**

Our solution: a star from the Küba Blue Line for each room size

With the Küba Blue Line, cheese production facility operators can enjoy a secure investment and long service life.

Two factors are decisive when selecting the right air cooler for the successful operation of cheese production, aging and storage rooms:

1. The **precise maintenance of the environmental conditions** and the appropriate aging time for the various types of cheese.
2. The use of materials that are **resistant to corrosion**.

The cheese production process starts with coagulating the milk by adding lactobacilli and rennet. Hygiene plays a significant role here in terms of preventing failed fermentation later. The air cooler must be **resistant to the corrosive substances in the cleaning and disinfecting** agents used.

The aging process begins in the salt bath, which can last anywhere from a few hours to five days. Depending on the type of cheese, it is treated with moulds, red smear or salt. Later, chemical and biochemical reactions determine aroma and consistency. Different storage periods give individual cheeses their typical character. The **salty, ammoniacal and acidic conditions in the room** in addition to the presence of bacteria, mould spores and **high humidity** have an **aggressive, corrosive** effect on the materials used to construct the air cooler.

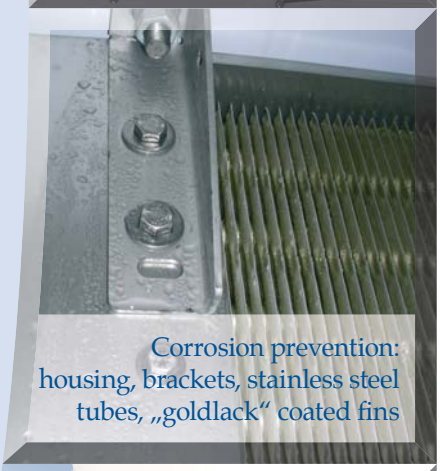
Cheese types	Aging Room Temp./Rel. humidity/ Period	Treatment
Chester, Cheddar	4-6°C/80-90%/6-12 mo.	Turn occasionally
Edamer, Gouda, Tilsiter	12-14°C/80-90%/4-9 wk.	Wash and dry every 10 days
Limburger, Romadur	14°C/90-95%/4-7 wk.	Spray with red mould or rub it in, treat every 3-4 days with salt water

Various forms of corrosion prevention and **flexibility in ventilation** play a decisive role in selecting the right air cooler. **Fans with speed controllers** create a comfortable atmosphere for both employees and the product. High quality **stainless steel housing and tubes** and **„goldlack" coated fins** guarantee maximum corrosion protection.

Because the entire production process depends on continuous refrigeration, the economic success or failure of the company also depends on **high facility security and reliability**. All **Küba Blue Line** Air Coolers meet these particular requirements. Hinged fans and fold-down drip trays make it easier to **clean the Air Coolers** while **meeting the requirements for food hygiene regulations** and the HACCP guidelines.

Küba SG *industrial:*
draft-free with air hose

Küba DZ *production:*
stainless steel housing



Corrosion prevention:
housing, brackets, stainless steel tubes, „goldlack" coated fins

Fold-down fan
makes the air cooler easy to clean

Flowers

The sensitivity of delicate **cut flowers** makes this refrigeration task particularly complex.

The cooled goods

Cut flowers are extremely complex cooled goods. To retain their perfect appearance, maintaining a **precise air temperature** in a range from + 2 °C to + 4 °C depending on the type of flower is an absolute necessity. Only orchids, anthuriums and Gerbera daisies like it a bit warmer, between + 5 °C and + 8 °C.

Even a slight reduction in humidity can cause the valuable blossoms and buds to wither. **High humidity, from 85 to 95 %,** is necessary.

But to really make sure the freshness of the flowers lasts longer, these conditions must be achieved with **„mild cooling".** Drafts can damage these sensitive cooled goods quickly.

The environment

However, in spite of the fact that flowers are often kept in **large spaces** where employees and customers also move about, the requirements for the environment are simple: **short-term storage,** low exposure of the cooling components to corrosive substances.

Note:
For storage in supermarkets, flowers should not be kept together with fruits or vegetables. Fruits and vegetables produce the ripening gas ethylene, which causes flowers to wither much more quickly.

Our solution: The Küba DZ *production* and the Küba SG

Draft-free Air Coolers achieve a mild cooling effect for sensitive flowers.

The market value of flowers depends directly on their freshness; wilted flowers cannot be sold. This freshness, i.e. with full, saturated colour, lush blossoms, vigorous leaves and stems, requires **maximum precision** in the maintenance of **storage temperature, humidity** and of course, very low, but **even air circulation** across the entire flower storage area.

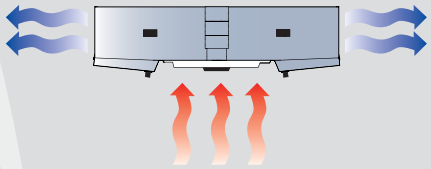
The Küba Blue Line is well-known for its long throw range and high air volume flow. **When set correctly, they cool cut flowers with tenderness.**

For draft-free, even ventilation with the Küba Blue Line SG, we recommend **using PVC or textile hose**. The manufacturer adapts this accessory precisely for the respective application. Without spending a great deal of time and effort on assembly **even long storage area can be cooled evenly and without drafts.** Regularly cleaning the air hoses is necessary to ensure trouble-free operation and a germ-free environment.

The Küba DZ *production* **model with „reduced air speed“** is perfectly adapted for draft-free ventilation. The air flows out evenly on **both sides of the cooler.** When it is mounted in the centre of the room, it provides air circulation on both sides. **Homogeneous room conditions** are the result. In addition, the air volume can be set with a delta/star switch to accommodate changing requirements. **The fold-down drip trays** make it easier to clean the cooler; in other models, **the fans are even hinged.**

Moreover, it is just as important to keep the **difference between the air temperature at entry and at exit** to a minimum. Discharge temperatures that are too low can lead to frost damaging the flower, making it impossible to sell them.

The precision required for maintaining the temperature and humidity is provided by the Küba HFE® tube/ fin system together with the Küba CAL® distributor. The lowest possible temperature difference (DT1), even frost build up on the fins with fewer defrost intervals and fewer dangerous temperature fluctuations minimise loss of value – the flowers retain their perfect appearance.



Küba DZ *production*
with low air speed

Küba DZ *production*
in use

Küba SG *commercial*
with adapter
for textile hose connection

Küba SG *industrial*
draft-free with air hose

In the deep-freeze: blood plasma

The sensitive, life-saving character of **blood plasma** and difficult environmental conditions make this refrigeration task complex.

The cooled goods

Deep freezing in medical and laboratory applications such as the preservation of blood, always provides a challenge.

After the blood is separated into its components and the donor bottles are filled, they are stored at a wide variety of temperatures.

While thrombocyte concentrate can only be stored for a few days at temperatures above 0 °C, blood plasma is stable for up to a year when stored at - 30 °C to - 40 °C.

Because **human lives depend on the quality of blood plasma,** in particular cases it is increasingly necessary to be able to guarantee **room temperatures of -45 °C or colder.**

Strong fluctuations in temperature can lead to decomposition. The blood plasma then poses a health risk and can therefore no longer be used.

The environment

The requirements for reliability and precise temperature maintenance are extremely high. Temperature drops caused by changing physical conditions must be prevented to the greatest possible extent with **very precise ventilation**. Keeping the temperature distribution in the frozen storage area as uniform and consistent as possible is imperative.

In this case, **humans present the greatest challenge** for the refrigeration system and the air cooler. Especially in medical and laboratory environments, scheduling when and how often someone enters the deep freeze area cannot be planned. Every time the door is opened and every second that it stays open, warm and, above all, moist air enters the room. The moisture condenses on the surface of the air cooler and reduces the refrigeration capacity. The cooler must be defrosted.

To prevent strong temperature fluctuations the **defrosting procedure must be carried out quickly** and **the heat it generates should, as far as possible, not be allowed to enter the room.**

Our solution: the powerful Küba SG models

The Küba Blue Line SG is the right solution for deep-freeze applications down to room temperatures of -55 °C.

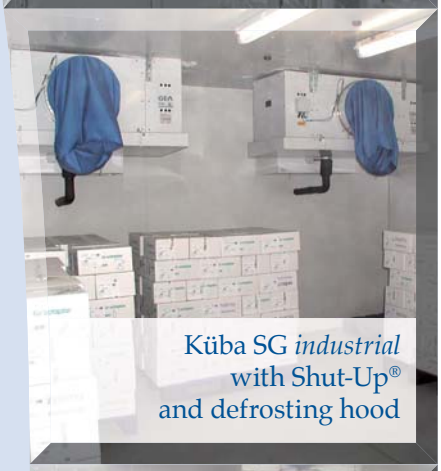
Very low temperatures in cold storage demand specially designed Air Coolers. For this reason there are **Küba Blue Line SG air cooler models optimised for each special task.** This high performance air cooler is based on the high capacity Küba HFE® tube/fin system with the Küba CAL® distributor, proven in thousands of applications. Even if the dehumidification of the cooled goods does not play a role in this application, the minimal frost build-up ensures a **long cooling period and long operating periods between defrosting phases.** This means that despite a high traffic load, the desired temperature can be maintained exactly and only rarely do the coolers require defrosting. **In view of the increasing cost of energy, this is an important contribution to the energy balance of the entire system.**

The material characteristics of the components used change significantly in this temperature range. Specialised knowledge is required to adapt the components to these operating conditions. **Special brazing material** used in the production of the heat exchanger prevents brittleness and stress cracks that could lead to leaks in the cooler. In deep-freeze operations, **electric motors** have to overcome high „internal" resistance. With the **grease and bearings we have developed in-house**, the air coolers start easily, even at very low temperatures. The **metal air duct and air straightener** always ensure even room ventilation and uniform temperature of the goods without the risk of heat pockets. Fans that are adapted to the operating conditions in this way **reduce the time** and **effort spent on maintenance and extend service life.**

Original Küba accessories complement the deep-freeze models perfectly.

In addition to the intense load placed on the materials that make up the air cooler, defrosting it presents a particular challenge. **The deep-freeze model with original Küba accessories is a perfectly coordinated package.** In addition to hot gas defrosting, electric defrosting is also available. With especially designed heater rods and **expanded heater sleeves**, short defrosting periods are possible. **Connector cables with silicon insulation** and **aluminium terminal boxes** prevent brittleness and short circuiting. The **fan collar heaters (VRB)** prevent the fan blades at the collar from freezing up. As an option, the ventilation duct on the Küba SG *industrial* can have a 5° inclination. This ensures that no condensation water remains in the air duct, but instead, flows into the drip tray. For maximum efficiency we recommend **insulated drip trays** and **Shut-Up® in combination with the double walled, insulated defrosting hood.** This way, the heat generated stays in the coil, **preventing an undesirable temperature increase in the frozen storage area.**

Küba SG *commercial* deep-freeze design



Küba SG *industrial* with Shut-Up® and defrosting hood

Küba SG *industrial* with Shut-Up® and defrosting hood in use

Fan collar heaters

In the deep-freeze: Fish

The modern processing methods in the food industry often rely on the advantages of freezer storage. This applies in particular for convenience foods, vegetables and naturally for **fish** and meat.

The cooled goods

To make production processes more efficient or to be able to select the right time to sell the products foods such as fish are often frozen for storage.

Large quantities are often frozen and **stored for periods spanning several days, weeks or months.** While this procedure does not pose problems for packaged products, when storing unsealed or exposed products, allow as **little moisture as possible to escape** to ensure that the cooled goods retain maximum quality.

Moreover, achieving flawless quality requires **absolute precision in the maintenance of the specified temperature.** Temperature fluctuations reduce quality.

The environment

System complexity depends on an entire range of factors.

Construction specifications, such as **large halls,** require a long throw range.

If the room is frequently filled or if products are regularly removed, opening and closing the doors causes a relatively **high input of moisture.**

The Air Coolers used must be able to accommodate this high amount of moisture and deal with it with **as few defrost intervals as possible.**

If **aggressive, corrosive particles suspended in the air enter in the storage area** from other rooms, this situation must also be taken into consideration when selecting corrosion protection.

Our solution: the powerful Küba SG *industrial*

The Küba SG *industrial*: the energy-saving powerhouse in the frozen storage area.

The standard models in the Küba Blue Line master classic deep freeze applications (-18 °C to -28 °C). Frozen goods should be stored at temperatures of at most -18 °C. **Thawing must be prevented,** even if a high traffic load allows a great deal of warm air and moisture to enter the storage area. The air that enters must be lead as quickly as possible to the air cooler. **Fans with speed control motors or delta/star switches** make it possible to adjust the air volume flow in this way.

The **standard air straighteners** for the Küba SG *commercial* and the Küba SG *industrial* provide **even room ventilation with cool air,** even in very long deep-freeze storage areas. Proper distance between the stacks of goods and the cold storage room walls ensures good air circulation. This achieves a uniform room temperature and prevents damage to the goods. Minimal dehumidification is also important for the storage of unsealed or exposed cooled goods. The Küba HFE® tube/fin system and the Küba CAL® distributor guarantee it. A long cooling period and long operating periods between defrosting phases ensure that the temperature of the cold storage area and the goods remain stable: **only rarely do the coolers have to be defrosted** – in view of the increasing cost of energy, this is **an important contribution to the energy balance of the entire system.**

Original Küba accessories complements the standard model perfectly.

Selecting the right corrosion protection plays a decisive role in operational reliability, particularly for fish and seafood products. For these applications, the **Küba SG *commercial*** and **Küba SG** *industrial* Air Coolers provide a suitable combination of materials.

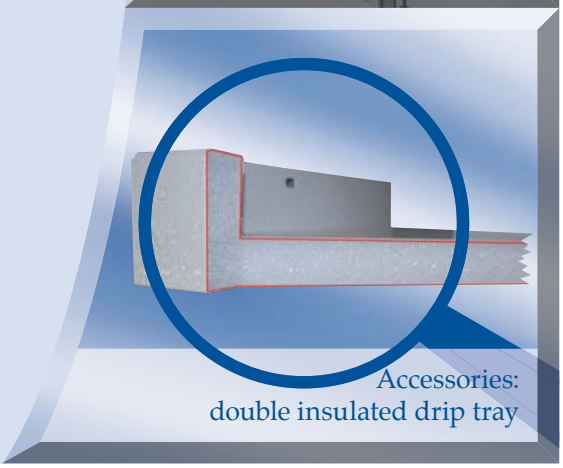
Defrosting the air cooler at low temperatures is a particular challenge. The **desired defrosting procedure (electric, hot gas, cold gas, brine)** can, as with the entire Küba Blue Line, be adapted for the respective system design.

To achieve maximum efficiency for these applications, we recommend using **Shut-Up®** in combination with **the double-walled, insulated Küba defrosting hood** and an **insulated drip tray.** This way, the heat generated stays in the coil, **preventing an undesirable temperature increase in the frozen storage area.** The option that includes a ventilation duct at a 5° incline ensures that condensation water runs out of the duct into the drip tray, which, together with the fan collar heaters (VRB), prevents the fan blades at the collar from freezing up.

Fan collar heaters with covering

Küba SG *industrial:* high capacity for the frozen storage area

Efficient defrosting with Shut-Up® and defrosting hood



Accessories: double insulated drip tray

Meat & Poultry

Meat and poultry are naturally high quality foods. To ensure that the quality remains high, the right treatment in accordance with food and consumer product legislation is of utmost importance.

The cooled goods

A wide variety of processing, storage and preparation processes have been developed to reap the benefits of meat, a valuable foodstuff.

Good refrigeration plays a decisive role here, above all in storage and subsequent processing. The primary goals of rapid cooling of carcasses are maintaining the **flawless, hygienic quality** of the meat and **preventing weight loss**. To achieve this, the core temperature after slaughter must be cooled to + 7 °C in a continuous cooling curve. For pig halves, it must be guaranteed that this carcass internal temperature is achieved within 20 hours, for beef halves, within 48 hours. Air speeds of 2-3 m/sec. at the product are required here. For poultry, hygiene ordinance 2004/853 EC for foods of animal origin specifies a core temperature of + 4 °C.

The environment

The complex environment in butcher shops and slaughterhouses is a particular challenge for Air Coolers.

Naturally, large quantities of meat require **high air flow rates.** Correspondingly, **a heavy accumulation of animal fat is deposited on air cooler surfaces.**

To meet requirements for hygiene (in accordance with food hygiene ordinances, VDI 6022, HACCP), **regular and intensive cleaning is necessary.** The agents used for cleaning and disinfection almost always contain **corrosive substances** that react aggressively with the materials used to construct the air cooler. For this reason, using the correct amount of the cleaners and disinfectants as well as removing them thoroughly is imperative.

Our solution: the Küba SG *industrial*

A secure investment that ensures compliance with hygiene guidelines over the long term.

Küba SG *industrial* Air Coolers are ideally suited for meat processing applications. These high performance Air Coolers meet 100 % of the requirements for both rapid cooling and the storage phase.

High performance – quick cooling

Quick cooling rooms in slaughterhouses require a **high air flow rate** due to their size and high external resistance. The Küba SG *industrial* has **reinforced fans**, which provide the reliability needed in connection with these demands.

The Küba SG *industrial*'s **air straighteners** guarantee a **directed air flow, achieving an air throw of up to 80 m.** Lower quantities of air are required for storage operations: **fans with speed controllers** ensure sufficient air movement in the storage phase.

Meet hygiene guideline requirements easily

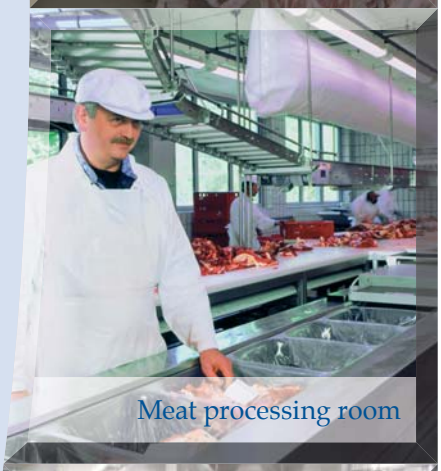
The strictness of hygiene guideline legislation is increasing for small and large slaughter operations and butcher shops alike. These specifications require that work and storage areas be cleaned and disinfected on a regular basis. In order **to withstand such intensive cleaning and disinfection procedures,** the Küba Blue Line offers models with **special corrosion protection** such as **stainless steel tubes, „goldlack" coated fins** (coating with epoxy-phenolic resin) and **housings coated with powder or protective paint.**

So that **cleaning is quick, simple and therefore cost-effective,** the Küba SG Industrial also comes with **hinged fans** (as an accessory); **the standard drip trays can be folded down.**

If the meat is to undergo further processing, such as a **smoking or salt curing process**, this must also be taken into consideration in terms of corrosion protection. For these applications we recommend a **stainless steel housing** and the **corrosion protection model with stainless steel tubes and „goldlack" coated fins.**

Rapid cooling

Storage room



Meat processing room

Küba SG *industrial*
corrosion protection design

Baked goods

In order to provide customers with fresh **baked goods** at any time, day and night, production processes have changed tremendously. So that the products only have to be baked on site, they are produced in a central location, flash frozen and then distributed. Sensitive cooled goods and particular environmental factors make these refrigeration tasks complex.

The cooled goods

The particular challenge is **rapidly cooling the baked goods without „blowing air" directly onto them.** In just 20 minutes, pastries must be cooled down to -7 °C at the core; partially baked goods must be cooled from +65 °C to +10 °C in 3 hours. To meet and guarantee these requirements, **high cooling capacity and air flow rates** are needed.

Pastries and partially baked products are very sensitive. Directly blowing air onto them at high speeds causes them to build a „skin" and dries out the surface or the crust tears when the product is baked. If it takes too long to reach the proper core temperature, ice crystals proliferate within the product and when it is thawed, too much water is removed, leading to a loss in quality. For this reason, **precise control of the ventilation is imperative.**

To ensure that the **products have an appetising appearance and taste good,** another requirement that the Air Coolers must meet is **minimal dehumidification. Shock freezing, when carried out professionally and appropriately,** allows foodstuffs to retain the optimum colour, taste and above all, their nutritional value.

The environment

The environmental demands depend on the actual task at hand. In the environment for this application, the following must be taken into consideration:

Special ventilation fittings installed on site allow for **a large air-side pressure drop.** The external resistance of the goods must also be assessed correctly. This is the only way to ensure that the right fan design will provide sufficient air flow rate.

Our solution: the Küba SF *blastfreezer* or Küba SG *industrial*

More than enough capacity for shock freezing. That's what the Küba Blue Line SF *blastfreezer* and SG *industrial* offer.

Achieving the specified core temperature quickly and reliably is the main challenge for shock freezing. Even small discrepancies in performance can cause delays which exceed the specified time limit and tasty treats become second-class goods that are only good for further processing. Precision in cooling capacity depends not only on the cooler's nominal capacity, **but also on the availability of this capacity when it is needed**. The Küba Blue Line SF *blastfreezer* and the Küba SG *industrial* are characterised by their long service life and short defrosting phases made possible by the Küba HFE® tube/fin system and the Küba CAL® distributor. Electric defrosting is used most frequently, but both product lines can be used with **any established defrosting procedure**, e.g. hot gas or additional brine cycle. Often, shock cells are only used 6-8 hours per day. In these cases, defrosting with air circulation with the cell door open is also possible. This saves significant amounts of energy.

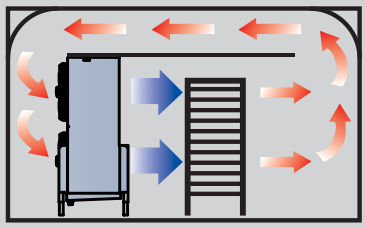
Even, optimised ventilation ensures the highest product quality

For shock freezing high quality baked goods, in addition to cooling capacity, **proper ventilation is especially important**. If the amount of air is too low or distributed unevenly, the baked goods do not cool evenly. In this way the specified core temperature is achieved too slowly in some of the baked goods. But if a pastry cools too quickly, it develops an unsightly skin or the crust tears when it is baked.

Because it can be **adapted to the height and length of the shelf carts**, the Küba SF *blastfreezer* guarantees that the impact of the cool air is uniform across the products. The air speed is selected such that drying is prevented. With the **Küba SG industrial, the secondary air flow is guided evenly over the products** so that low air speed **ensures maximum product quality** here as well.

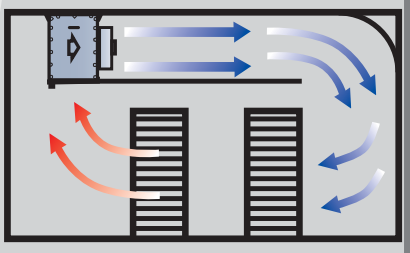
With tunnel freezers and spiral freezers, the effects of moist, warm bakery air must be prevented. For smooth, trouble-free operation, it is important to clearly define the amount of goods and the entry temperatures in the design phase and to include reserves in the plan. If the planned quantities or temperatures are exceeded, achieving the core temperature by the time specified is no longer possible. The products will no longer look and taste good.

Küba SF *blastfreezer*



Examplary of ventilation with the Küba SF *blastfreezer*

Küba SG *industrial*



Examplary of ventilation with the Küba SG *industrial*

Distribution warehouse storage

Distribution warehouses are responsible for distributing goods for entire companies and serve as an interface between producer and customer or between wholesale and retail sellers.

The cooled goods

Distribution warehouse storage is planned and operated for a wide variety of cooled goods.

To ensure that the products can be sold for the best price possible, they must be in perfect condition. It doesn't matter whether they are packaged or unsealed goods – in normal cold storage or frozen storage.

The environment

Regardless of the cooled goods themselves, the demands of the environment are usually complex.

High stock turnover causes a high rate of traffic in the loading area. Wear debris from tyres and pavement as well as dust from paperboard containers enters the air to be cooled and is drawn into the Air Coolers. Some of it is blown back out again.

For this reason, especially the loading areas and the cooling rooms must be easy to clean. Moreover, the Air Coolers used must have a high cooling capacity and offer long cooling periods. The construction design usually requires a long air throw range.

Our solution: the Küba SG *industrial*

The Küba SG *industrial* is the perfect air cooler for applications that require high refrigerating capacity, a long air throw range and easy cleaning. In all temperature ranges.

Large quantities of goods are often brought into distribution warehouses and it is not always possible to prevent a lot of warm air from entering the hall during these extended loading periods. For this reason, the Air Coolers have to have high cooling capacity to keep the storage temperature exactly in the specified range. Optimised fans with high air volume flow and the HFE® tube/fin system ensure that the Küba SG *industrial* lives up to these demands.

The size of many distribution warehouses requires a long air throw range to achieve a uniform temperature across the entire hall. The Küba SG *industrial*'s air straightener guarantee a directed air flow, achieving an air throw of up to 80 m.

Compliance with hygiene guideline legislation also plays an important role in distribution warehouses. In order that the regularly required cleaning is quick, simple and cost-effective, the Küba SG *industrial* has fold-down drip trays in the standard model and optional hinged fans.

If a distribution warehouse includes several cold storage rooms, the Küba SG *industrial* can easily adapt to different temperature requirements due to the numerous model types and original Küba accessories.

The Küba SG *industrial* standard model meets all requirements for normal cooling tasks.

For frozen storage we recommend the optional Küba defrosting hood, the Küba Shut-Up® and the insulated drip tray to ensure short defrosting times that use minimal heat energy. This also prevents water vapour from entering the hall.

Loading area in a distribution warehouse

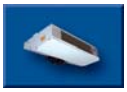
Küba SG *industrial*

Receiving area in a distribution warehouse

Küba SG *industrial*

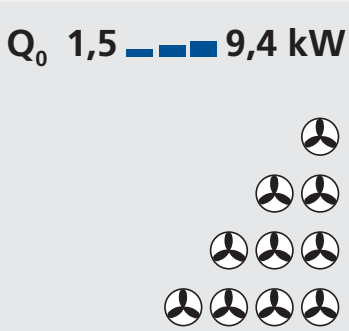
In certain circumstances when external temperatures are very high, the dew point can be reached in the loading zone and condensation can form in the drip tray. Water drops could fall onto the goods stored below and damage the packaging. For this reason we recommend an insulated drip tray for loading zones and for areas kept at temperatures just over 0 °C.

Küba DE *professional*

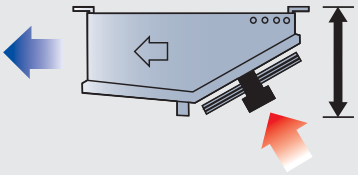


Küba DE *professional*: Specific advantages

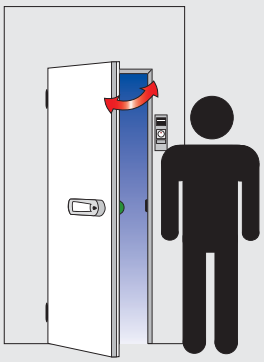
High performance ceiling-type unit cooler that covers a large scope for commercial applications.



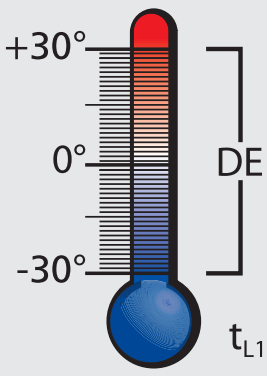
Compact unit ceiling-type cooler for complex refrigeration tasks in small and low spaces.



The Küba DE *professional* can cope with difficult environmental conditions, e.g. doors that are frequently opened, open sales areas, low noise requirements.



All temperature ranges can be maintained at the highest level of precision.



Construction

1. Casing

- Al-Stucco, top panel: galvanised steel
- High-grade powder coating, papyrus white RAL 9018
  - Food quality
  - Easy to clean
  - Optimum corrosion protection
- Drip tray and side panels removable
- Low construction height
- Quick and easy assembly
- Stainless steel mounting material and brackets
- Plastic drain

2. Heat exchanger

- Fin spacing
  DEA.D: 4,5 mm
  DEB.D: 7 mm
- Tube arrangement aligned, spacing 50 x 50 mm
- HFE® tube / fin system
- Tubing: Cu-special
  Fins: Al
  End plates: Al
- Küba-CAL® refrigerant distributor for multiple injection

3. Fans

- Fans individually connected to internal junction box
- Ø 300 mm
- In accordance with VDE specifications with built-in protector
- Application range: -30 °C bis +50 °C
- 230 ± 10% V-1~
- 50 / 60 Hz
- Protection class IP44 in accordance with EN 60529
- Insulation class B in accordance with EN 60034
- Operating data can be found with Küba Select or in the technical data
- Optional Controller:

Phase control	☐
Transformer	☑
Delta / star	☐
Frequency converter	☑

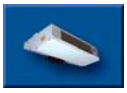
⚠ Please observe the manufacturer's information

Motor label data (max. allowable value +40°C)

50 Hz			60 Hz		
min^{-1}	W	A	min^{-1}	W	A
1400	65	0,30	1500	90	0,40

4. Electric defrost

- 230 ±10% V-1~ oder 400 ±10% V-3~ -Y
- Heaters with CrNi tube sleeves
- Vapour-tight connections
- Connector cable 1.5 mm^2 x 1000 mm
- Designed to defrost the heat exchanger quickly and evenly
- To prevent steam build-up and to accomplish heat exchange with almost no loss, the heaters are mounted in special expanded tube sleeves
- Wired ready for connection to the connection box in accordance with VDE specifications



Refrigerant / coolant

- Can be used with all HFC refrigerants, performance data can be found with Küba Select (Product Selection Software)
- For water / brine circulation choose your air cooler with Küba Select
- For CO_2 operation and for NH_3 applications immediate selection with Küba Select is possible; or ask our technical staff in sales

! The performance data in the Q_V charts refer to the combination of materials: tubes, Cu / fins, Al.

Küba Blue Line
Freshness that lasts longer

Technical data (R404A) DE...D 4,5 / 7 mm

Nomenclature

Standard

DE | A | E | 07 | 1 | D

- Line designation
- Fin spacing: A = 4,5 mm, B = 7 mm
- E = with electric defrosting
- Generation model
- Number of fans: 1 - 4
- Size: 07 - 09




DEA(E) ...D — 4,5 mm

Model		Rating Q_0 at 50 Hz t_{L1} ±0°C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18°C DT1 = 7K	Surface	Airflow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Blade	Sound output	Fans (operating values at 50 Hz)***			Electric Defrosting 230 V-1~ 400 V-3~
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm	$L_{W(A)}$**	min⁻¹	W	A	kW
DEA 071D	✇	1,90	1,51	12,9	1100	9	2,8	12	15	300	68	1357	84	0,35	1,46
DEA 081D	✇	2,10	1,67	16,1	1070	9	3,5	12	15	300	68	1357	84	0,35	2,15
DEA 091D	✇	2,35	1,87	19,3	1035	9	4,2	12	15	300	68	1357	84	0,35	2,15
DEA 072D	✇✇	3,80	3,02	25,8	2200	11	5,6	12	15	300	71	1357	84	0,35	2,51
DEA 082D	✇✇	4,20	3,34	32,2	2140	11	7,0	12	22	300	71	1357	84	0,35	3,72
DEA 092D	✇✇	4,70	3,74	38,6	2070	11	8,4	12	22	300	71	1357	84	0,35	3,72
DEA 083D	✇✇✇	6,30	5,01	48,3	3210	12	10,5	10*	22	300	73	1357	84	0,35	5,24
DEA 093D	✇✇✇	7,05	5,60	57,9	3105	12	12,6	10*	22	300	73	1357	84	0,35	5,24
DEA 084D	✇✇✇✇	8,40	6,68	64,4	4280	16	14,0	10*	22	300	74	1357	84	0,35	5,15
DEA 094D	✇✇✇✇	9,40	7,47	77,2	4140	16	16,8	10*	28	300	74	1357	84	0,35	5,15

DEB(E)...D — 7 mm

Model		Rating Q_0 at 50 Hz t_{L1} ±0°C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18°C DT1 = 7K	Surface	Airflow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Blade	Sound output	Fans (operating values at 50 Hz)***			Electric Defrosting 230 V-1~ 400 V-3~
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm	$L_{W(A)}$**	min⁻¹	W	A	kW
DEB 071D	✇	1,53	1,22	5,4	1280	10	2,8	12	15	300	68	1357	84	0,35	1,46
DEB 081D	✇	1,80	1,43	10,6	1220	10	3,5	12	15	300	68	1357	84	0,35	2,15
DEB 091D	✇	2,00	1,59	12,7	1120	10	4,2	12	15	300	68	1357	84	0,35	2,15
DEB 072D	✇✇	3,06	2,43	16,8	2560	12	5,6	12	15	300	71	1357	84	0,35	2,51
DEB 082D	✇✇	3,60	2,86	21,2	2440	12	7,0	12	22	300	71	1357	84	0,35	3,72
DEB 092D	✇✇	4,00	3,18	25,4	2240	14	8,4	10*	22	300	71	1357	84	0,35	3,72
DEB 083D	✇✇✇	5,40	4,29	31,8	3660	14	10,5	10*	22	300	73	1357	84	0,35	5,24
DEB 093D	✇✇✇	6,00	4,77	38,1	3360	14	12,6	10*	22	300	73	1357	84	0,35	5,24
DEB 084D	✇✇✇✇	7,20	5,72	42,4	4880	17	14,0	10*	22	300	74	1357	84	0,35	5,15
DEB 094D	✇✇✇✇	8,00	6,36	50,8	4480	17	16,8	10*	28	300	74	1357	84	0,35	5,15

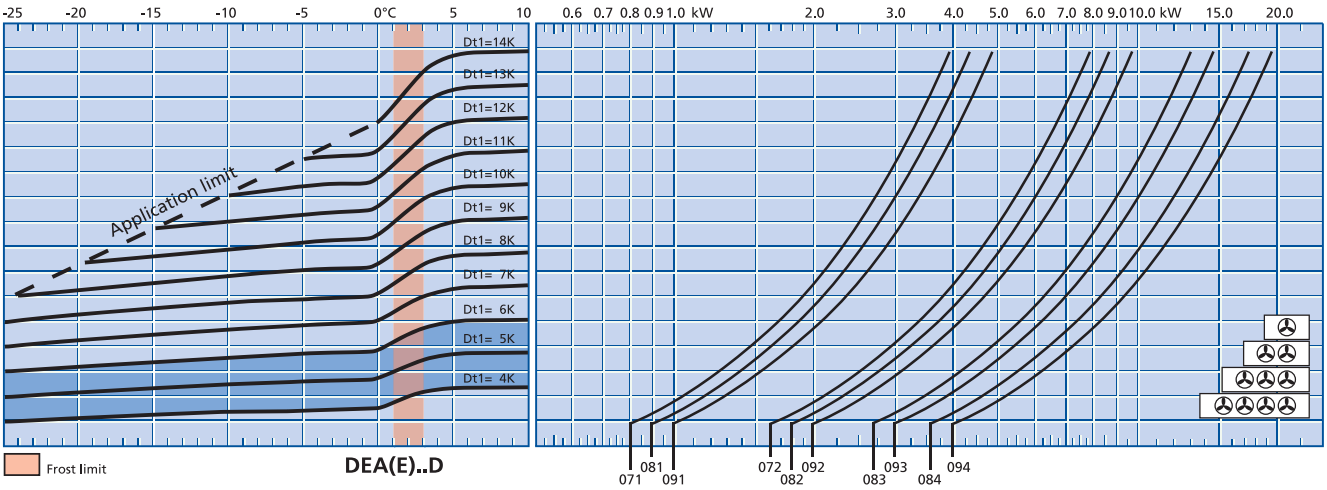
* Multiple injection with Küba CAL®
** Changes in sound power level, see page 131
*** Values free discharge, dry fin surfaces, RT 20 °C

Q_V chart (EN 328, R404A) DE...D 4,5 / 7 mm

DEA(E) ...D

t_{L1} [°C] Air inlet temperature

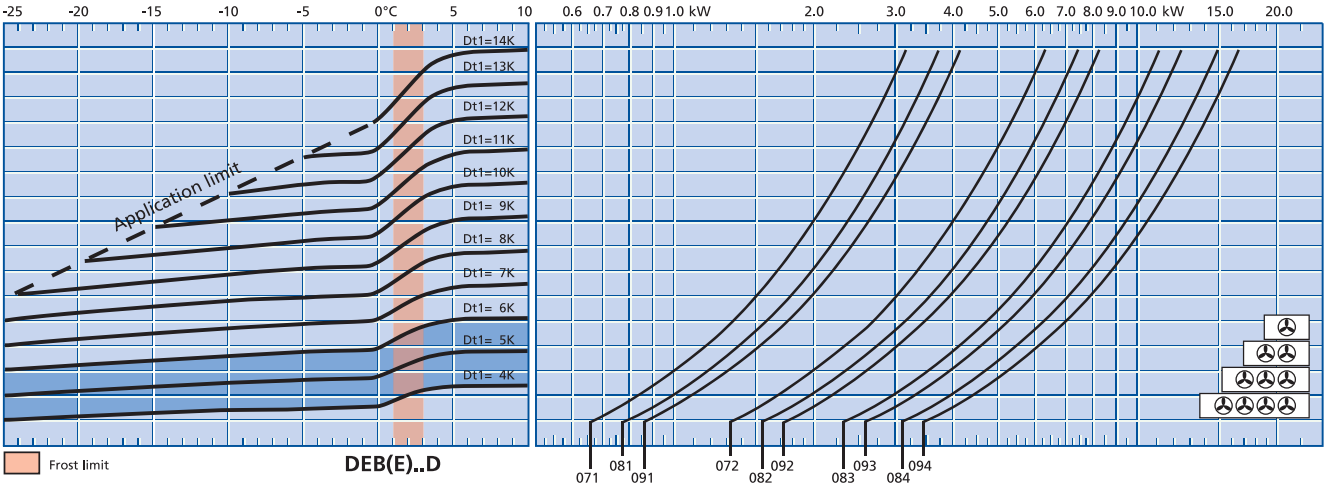
Q_0 [kW] Cooling capacity



DEB(E) ...D

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity

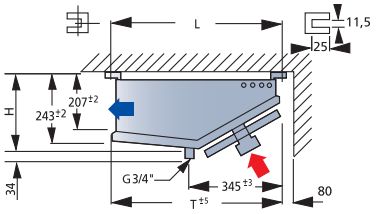


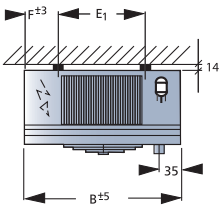
Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference $= t_{L1} - t_0$ (°C)

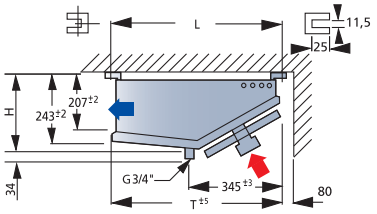
DT1 = 4 K bis 6 K
with electronic expansion valve

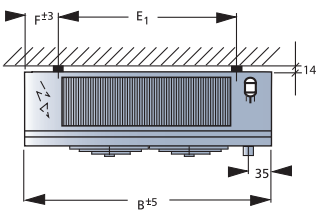
Example selection:
For example and explanation, see the information section on p. 136.

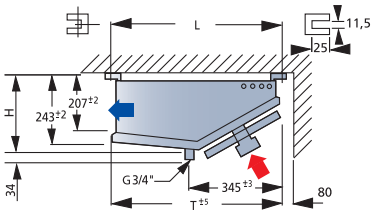
Dimensional drawings, dimensions, electric defrosting, weights

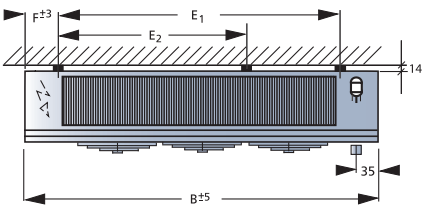


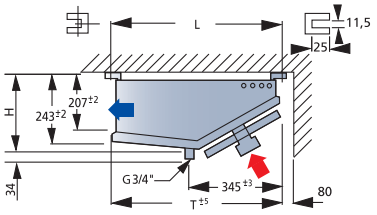


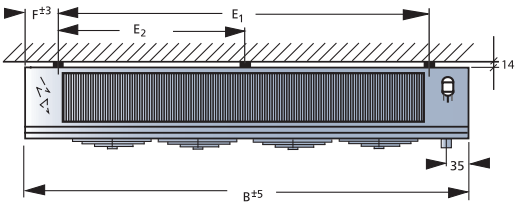




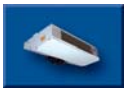








	Dimensions							Electric Defrost 230 V-1~/400 V3-3-Y~			Net weight	
Model	H	B	T	L	E_1	E_2	F	Coil	Tray	Total	DEA.D	DEB.D
	mm	mm	mm	mm	mm	mm	mm	kW	kW	kW	kg	kg
DE. 071D	260	1080	660	672	730	-	175	0,69	0,77	1,46	25,8	24,0
DE. 081D	260	1080	660	672	730	-	175	1,38	0,77	2,15	26,7	28,0
DE. 091D	260	1080	660	672	730	-	175	1,38	0,77	2,15	31,0	26,4
DE. 072D	260	1780	660	672	1430	-	175	1,21	1,30	2,51	44,8	41,1
DE. 082D	260	1780	660	672	1430	-	175	2,42	1,30	3,72	46,9	42,2
DE. 092D	260	1780	660	672	1430	-	175	2,42	1,30	3,72	54,2	53,6
DE. 083D	260	2480	660	672	2130	1400	175	3,44	1,80	5,24	67,0	61,8
DE. 093D	260	2480	660	672	2130	1400	175	3,44	1,80	5,24	73,4	70,2
DE. 084D	260	3180	660	672	2830	1400	175	4,58	0,57	5,15	79,4	72,2
DE. 094D	260	3180	660	672	2830	1400	175	4,58	0,57	5,15	86,6	76,5



Alternative versions / accessories

Motor versions

- **Version V1.33 – quiet design**

  Particularly suited for sales areas, etc.
  - Reduced air volume flow, VL
  - Lower sound power level, Lw (A)
  - Fans 230 ± 10% V-1~

For other alternative motor versions, see Küba Select or version overview, p. 126

Water / brine circulation

- **Version V2.05**

  Large number of circuits (small pressure drop)

- **Version V2.06**

  Small number of circuits (large pressure drop)

Casing versions

Double insulated Drip Tray

- **V3.09**

The double insulated drip tray has 6 mm of insulation.

The insulation prevents condensation water from building up on the bottom side of the tray and reduces the transfer of Defrost Heat into the Cold Room.

This changes the following dimensions:

Width B: +10 mm
Height H: +10 mm
Depth T: +10 mm

Defrost Versions

All Küba Air Coolers are available with electric defrosting. See nomenclature, p. 36

Protection against corrosion

- **Version V6.01**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al, protective coating on both sides

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on both sides

- **Version V6.02**

Heat exchanger:
Tubing: Stainless steel
Fins: Al „goldlack“ coating
End plates: Stainless steel

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on both sides

- **Version V6.03**

Heat exchanger:
Tubing: Stainless steel
Fins: Al
End plates: Al

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on one side

- **Version V6.04**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on one side

Further information regarding corrosion protection can be found on pages 132 to 135

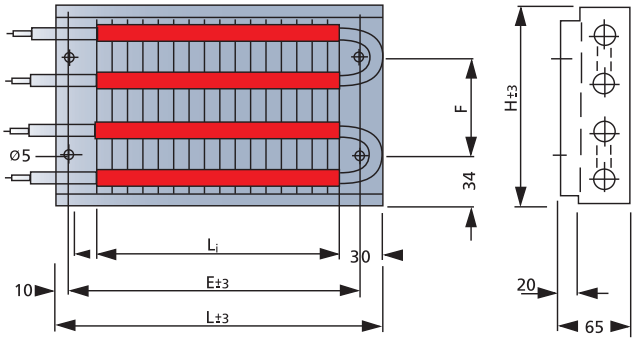
Note:
Details regarding the versions pictured here can be found in the product selection software Küba Select

Accessories

Electric radiator HR

For Air Coolers with blow through fans, for on site assembly.

Suitable for air conditioning or heating in winter. For optimum heat transfer, the heaters are mounted in Cu tube sleeves.



Only for use with running air cooler fans so that the ceiling of the cold storage areas does not overheat.

Design:

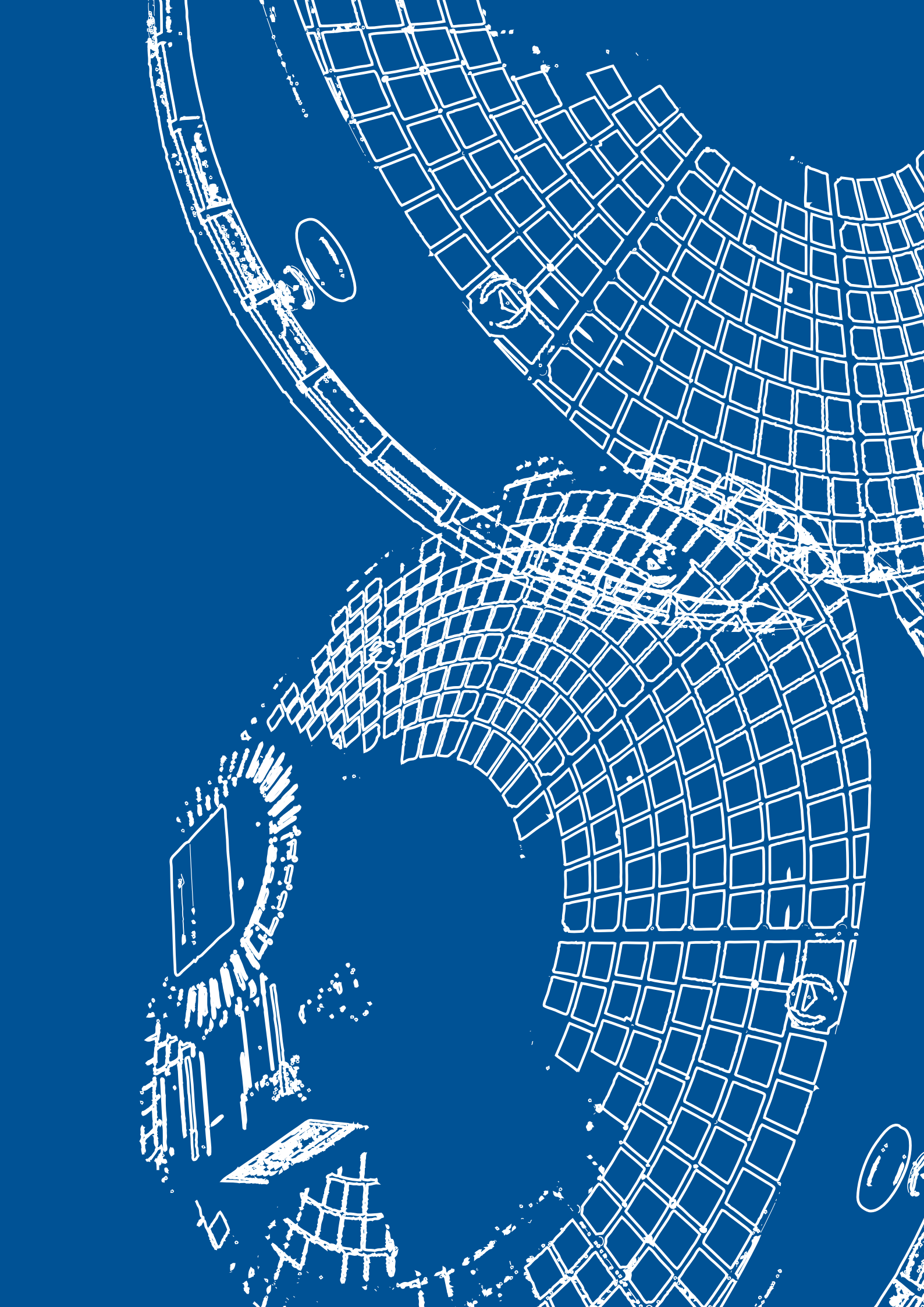
- 230 ± 10% V-1~ oder 400 ± 10% V-3~ -Y
- Heaters with CrNi steel sleeve
- Vapour-tight connections
- Connector cable 1.5 mm² x 1000 mm
- Casing: Al
- Fins: Al
- Tube sleeves: Cu

Electric radiator

Model	Nominal capacity at 230V	Dimensions					Weight
	kW	H	L	L_i	E	F	kg
HR4-70	1,07	145	755	700	733	76	1,69
HR4-140	2,14	145	1433	1400	1433	76	3,00
HR4-210	3,37	145	2133	2100	2133	76	4,34
HR4-280	4,33	145	2855	2800	2833	76	5,76

Selection table

For Air Coolers		Electric radiator 230±10%V-1~	
	Quantity	Model	Connection value per air cooler
		HR	kW
071D	1	4-70	1,07
081D	1	4-70	1,07
091D	1	4-70	1,07
072D	1	4-140	2,14
082D	1	4-140	2,14
092D	1	4-140	2,14
083D	1	4-210	3,37
093D	1	4-210	3,37
084D	1	4-280	4,33
094D	1	4-280	4,33

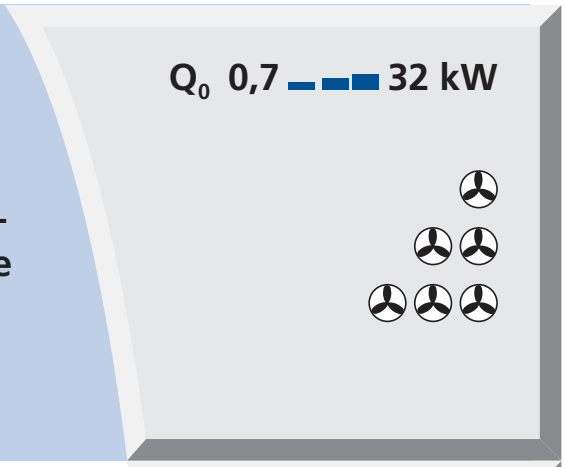


Küba SG *commercial*

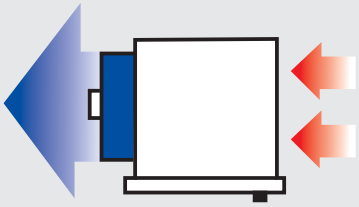
Küba SG *commercial*: Specific advantages

High performance air cooler for commercial applications with a large scope and complete capacity spectrum.

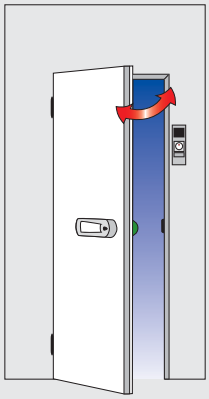
Draw-through fans guide the air flow evenly through the heat exchanger, enabling the maximum use of the air cooler surface.



Goods are cooled down more quickly with optimum air distribution, thanks to the patented, standard air straightener.

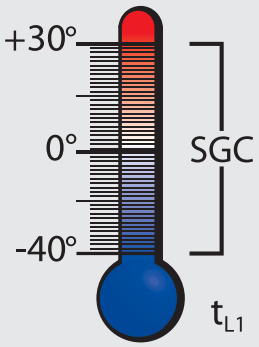


The Küba SG *commercial* can cope with the most difficult environmental demands due to its comprehensive standard equipment and numerous alternative versions as well as accessories.



Precision in the cold storage room has a name: Küba SG *commercial*

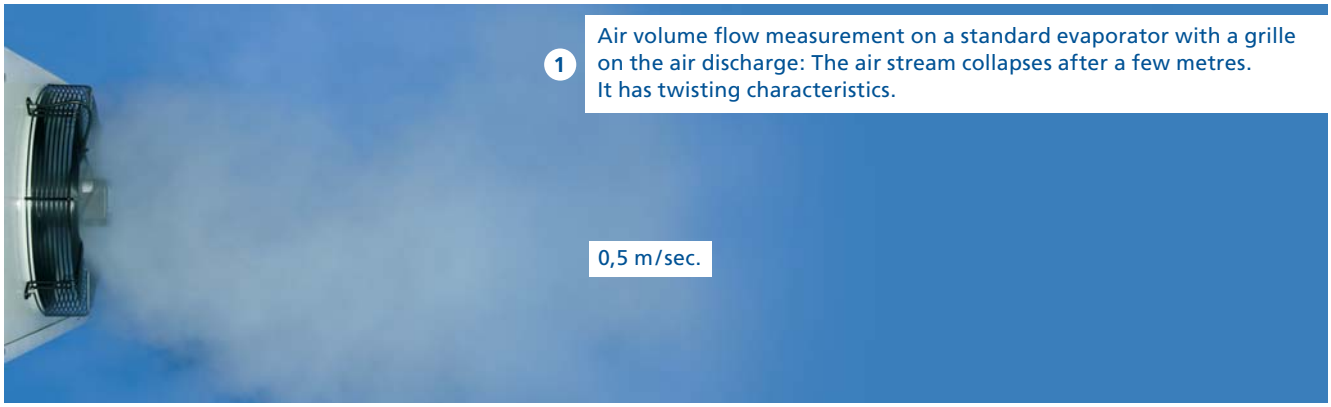
The Küba SG *commercial* sets the worldwide standard for all high performance Air Coolers in cold and frozen Chill Rooms.



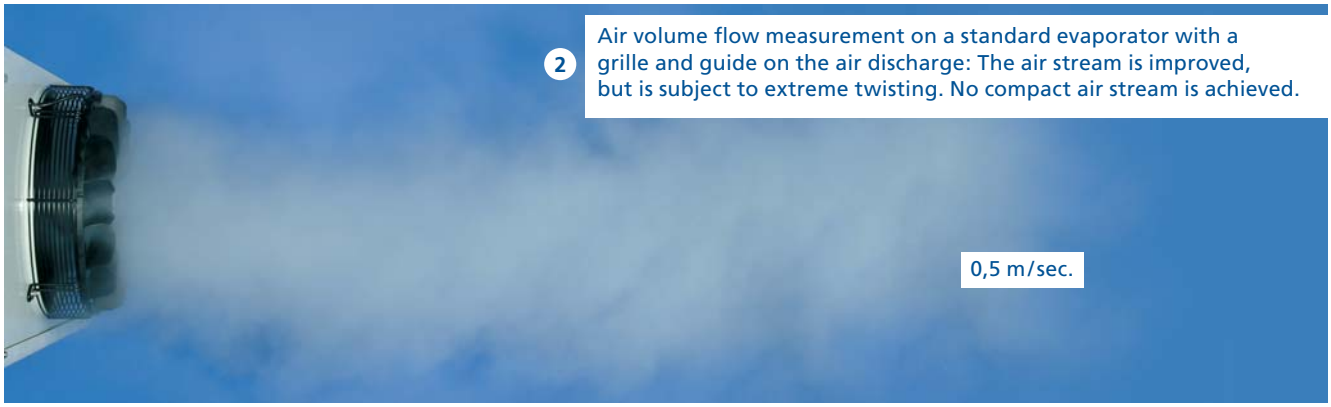
Küba SG *commercial*: Specific advantages

What are the effects of a long air throw range?

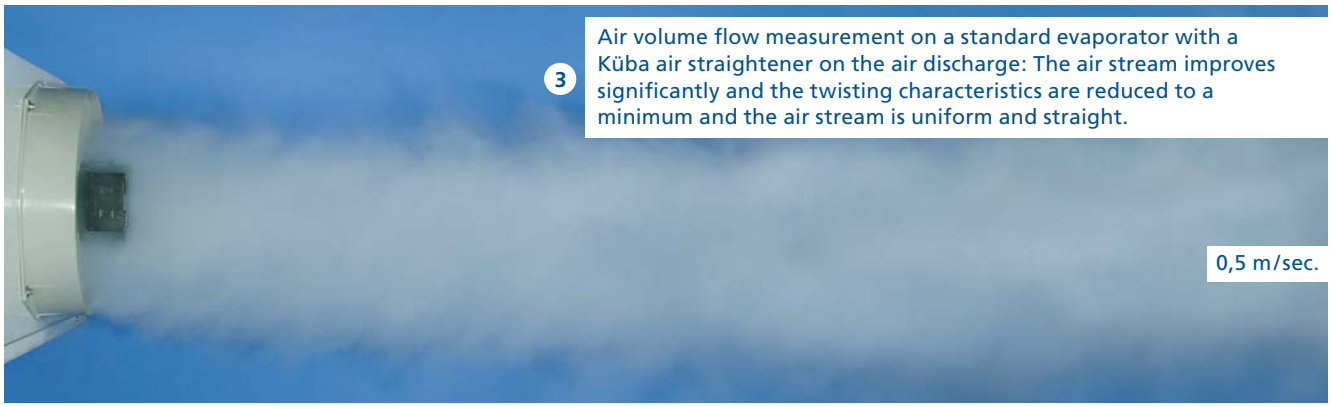
Grille



Grille and guide-wheel



Küba air straightener



Air throw comparison at a nominal capacity of 5.95 kW

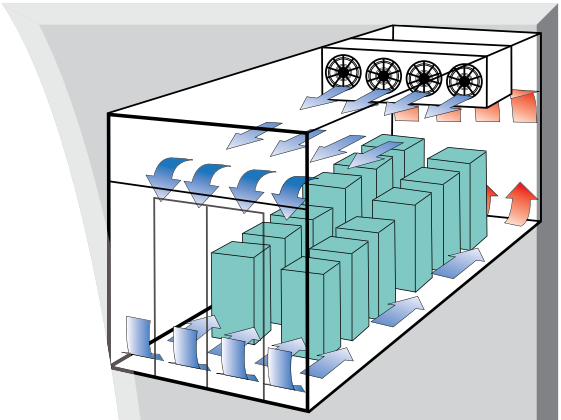
Küba SG *commercial*: Specific advantages

Goods stay at a uniform temperature due to improved air distribution

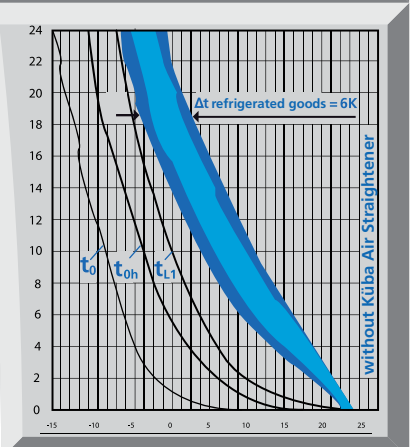
Refrigeration in large, long cold storage areas can be effected with Küba Air Coolers. Very long throw ranges can be achieved with the air straighteners. This allows the chilled air to reach the most remote corners of the cold storage area. In connection with the product specific stacking, room ventilation is trouble-free. Heat pockets are prevented.

Clear advantages are:
- Even air distribution
- Short cooling times
- Uniform product cooling
- No fluctuations in product temperatures
- Quality is retained

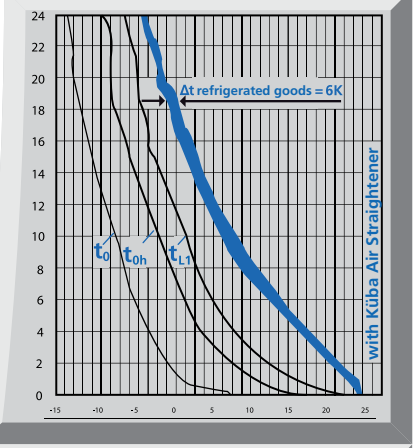
Küba Air Straighteners ➡ short cooling times



Cooling curve comparison
Küba high performance SG Air Coolers



Without Küba Air Straighteners
- Poor room ventilation
- Large differences in product temperatures: 6K
- Relatively long cooling times

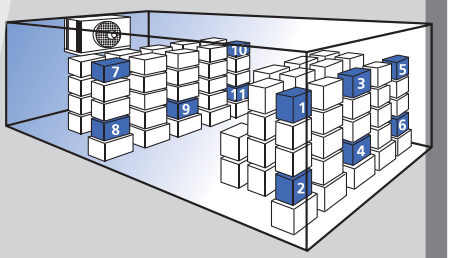


With Küba Air Straighteners
- Better distribution of cooled air
- Products are cooled more evenly: 1K
- Short cooling times
- Lower temperature difference (DT1)
- Lower operational costs

Key:
t_0 = Evaporating temperature at coil outlet
t_{0h} = Superheated temperature at coil outlet
t_{L1} = Air entry temperature into the air cooler

Küba Air Straighteners ➡ More uniform product temperatures

Uniform product temperatures:
Documented by measurement series in cold storage area

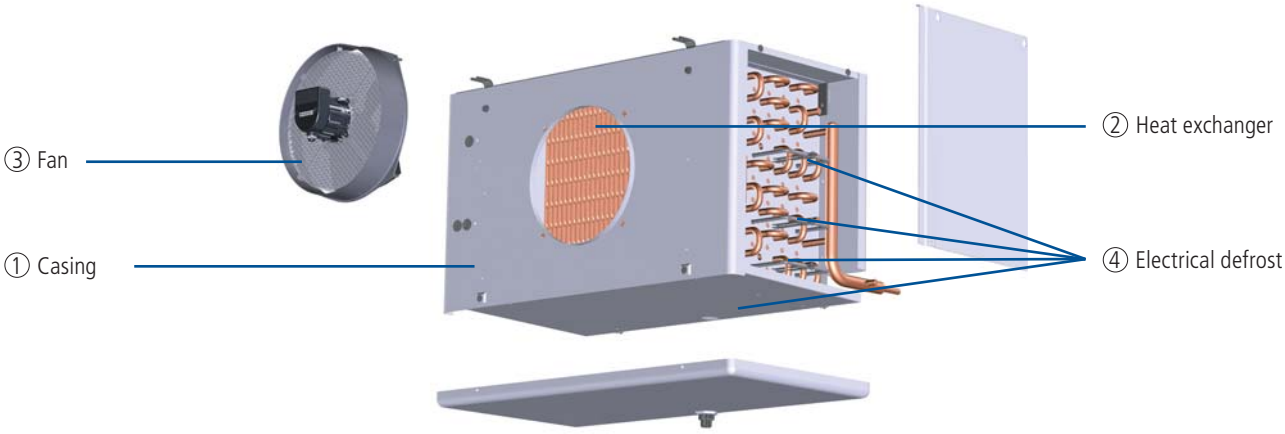


To perform the cooling curve comparison, a cold storage area was filled with stacks of goods. The measuring points 1-11 show the development of the product core temperature in relation to cooling time.

The starting conditions were identical in both trials – entry temperature 24 °C. For the cooler without an Air straightener, the temperature difference in the stack of goods after 21 hours cooling time was 6K.

The Küba SG with Air straightener achieved the outstanding result of only a 1K temperature difference.

Construction



1. Casing

- Al-Stucco
- High-grade powder coating, papyrus white RAL 9018
  - Food quality
  - Easy to clean
  - Optimum corrosion protection
- Drip tray and side panels removable
- Stainless steel mounting material and brackets
- Plastic drain

2. Heat exchanger

- Fin spacing
  SGA.C: 4,5 mm
  SGB.C: 7 mm
  SGL.C: 12 mm
- Tube arrangement aligned, spacing 50 x 50 mm
- HFE® tube / fin system
- Tubing: Cu-special
  Fins: Al
  End plates: Al
- Küba-CAL® refrigerant distributor for multiple injection

3. Fans

- Ø 250 to 500 mm
- In accordance with VDE specifications with built-in protector
- Application range: -40 °C bis +45 °C
- SG. 011 -083C: 230 ±10%V-1~, 50/60Hz
- SG.091 -103C: 400±10%V-3~, 50/60Hz
- Protection class IP44 in accordance with EN 60529
- Insulation class F in accordance with EN 60034
- Operating data can be found with Küba Select or in the technical data

• Optional Controller:	011-083	091-103
Phase control	☑	☑
Transformer	☑	☑
Delta / star	☐	☐
Frequency converter	☐	☑

⚠ Please observe the manufacturer's information.

Motor label data (max. allowable value +40°C)

	50 Hz			60 Hz		
	min^{-1}	W	A	min^{-1}	W	A
SG. 011/021C	1300	38	0,17	1500	52	0,21
SG. 031/041C	1300	90	0,40	1415	128	0,51
SG. 051-081C	1360	210	0,95	1395	148	0,58
SG. 091/101C	1400	450	1,00	1600	630	1,2

Note:
4 and 4 motor models on request

4. Electrical defrost

- 230 ±10% V-1~ or 400 ±10% V-3~ -Y
- Heaters with CrNi steel sleeve
- Vapour-tight connections
- Connector cable 1.5 mm^2 x 1000 mm
- Designed to defrost the fin package quickly and evenly
- To prevent vapour build-up and to accomplish heat transfer with almost no loss, the heaters are mounted in special expanded tube sleeves
- Wired ready for connection to the connection box in accordance with VDE specifications

Refrigerant / coolant

- Can be used with all HFC refrigerants, performance data can be found with Küba Select (Product Selection Software)
- For water / brine circulation choose your air cooler with Küba Select
- For CO_2 operation and for NH_3 applications immediate selection with Küba Select is possible; or ask our technical staff in sales

! The performance data in the Q_V charts refer to the combination of materials: tubes, Cu / fins, Al.

Küba Blue Line
Freshness that lasts longer

Technical data (R404A) SGA...C 4,5 mm

Nomenclature

Standard

SG | A | E | 10 | 2 | C

- Line designation
- Fin spacing: **A = 4,5 mm**, **B = 7 mm**, **L = 12 mm**
- Electrical defrosting: **E = with electrical defrosting**
- Installation size : **01-10**
- Number of fans: **1-3**
- Generation model

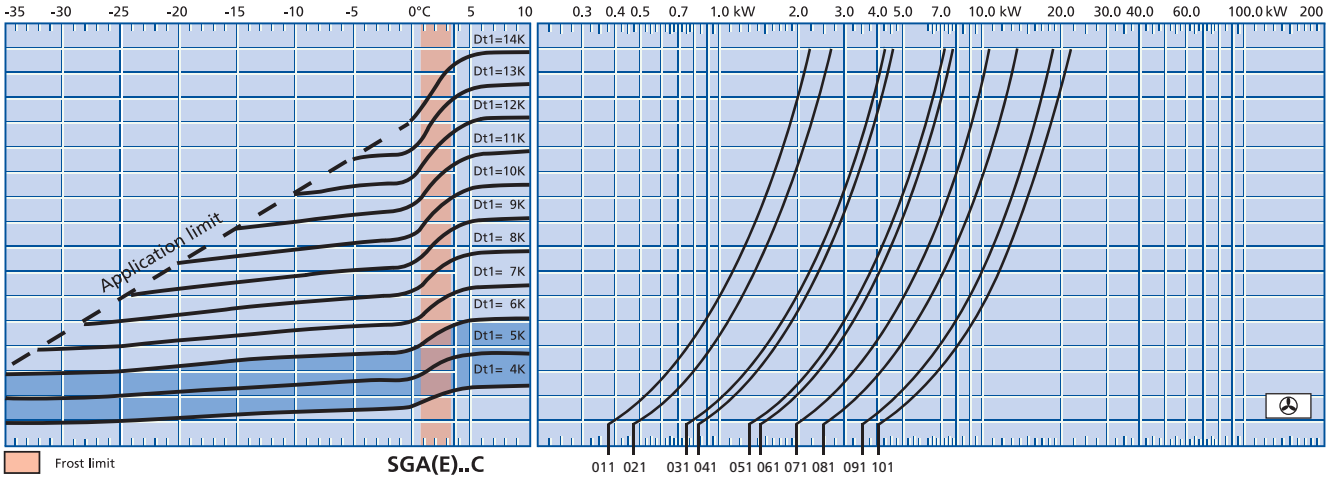
Model		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Connections Blade	Type of current	Fans (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm		min⁻¹	W	A
SGA 011C	✇	1,00	0,79	7,3	620	7	1,3	10	15	250		1301	32	0,15
SGA 021C	✇	1,23	0,97	9,7	520	7	1,3	10	15	250		1301	32	0,15
SGA 031C	✇	1,98	1,57	12,5	1060	10	2,1	10	15	300		1295	86	0,38
SGA 041C	✇	2,19	1,73	16,6	970	10	2,8	10	15	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGA 051C	✇	3,45	2,74	23,1	1620	13	3,8	10	22	400		1307	105	0,46
SGA 061C	✇	3,81	3,03	28,7	1600	13	4,8	10	22	400		1307	105	0,46
SGA 071C	✇	5,69	4,52	34,5	2610	19	5,7	10*	22	400		1362	205	0,90
SGA 081C	✇	6,73	5,34	51,5	2640	19	8,8	10*	28	400		1362	205	0,90
SGA 091C	✇	9,42	7,49	61,8	4010	23	10,6	10*	28	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGA 101C	✇	10,80	8,57	82,3	4300	23	13,6	12*	35	500		1417	360	0,86
SGA 012C	✇✇	1,99	1,57	14,5	1240	11	2,3	10	15	250		1301	32	0,15
SGA 022C	✇✇	2,45	1,94	19,2	1040	11	3,1	10	18	250		1301	32	0,15
SGA 032C	✇✇	3,96	3,14	24,6	2120	14	3,9	10	18	300		1295	86	0,38
SGA 042C	✇✇	4,38	3,47	33,0	1940	14	5,3	10	22	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGA 052C	✇✇	6,91	5,48	45,7	3240	18	7,6	10*	28	400		1307	105	0,46
SGA 062C	✇✇	7,62	6,05	57,1	3200	18	9,1	12*	28	400		1307	105	0,46
SGA 072C	✇✇	11,37	9,02	68,5	5220	26	10,8	12*	35	400		1362	205	0,90
SGA 082C	✇✇	13,46	10,68	103,0	5280	26	16,6	15*	35	400		1362	205	0,90
SGA 092C	✇✇	18,86	14,98	123,0	8020	33	19,8	15*	35	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGA 102C	✇✇	21,60	17,16	164,0	8600	33	26,1	15*	42	500		1417	360	0,86
SGA 013C	✇✇✇	2,99	2,36	21,5	1860	13	3,4	10	15	250		1301	32	0,15
SGA 023C	✇✇✇	3,68	2,92	28,7	1560	13	4,5	10	22	250		1301	32	0,15
SGA 033C	✇✇✇	5,94	4,70	37,0	3180	17	5,8	10	28	300		1295	86	0,38
SGA 043C	✇✇✇	6,57	5,20	49,2	2910	17	8,1	10*	28	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGA 053C	✇✇✇	10,35	8,21	68,3	4860	22	11,1	12*	35	400		1307	105	0,46
SGA 063C	✇✇✇	11,42	9,07	85,5	4800	22	13,1	12*	35	400		1307	105	0,46
SGA 073C	✇✇✇	17,06	13,54	103,0	7830	32	16,2	15*	35	400		1362	205	0,90
SGA 083C	✇✇✇	20,19	16,02	154,0	7920	32	24,6	22*	42	400		1362	205	0,90
SGA 093C	✇✇✇	28,29	22,47	184,0	12000	40	29,6	22*	54	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGA 103C	✇✇✇	32,41	25,75	246,0	12900	40	38,5	22*	54	500		1417	360	0,86

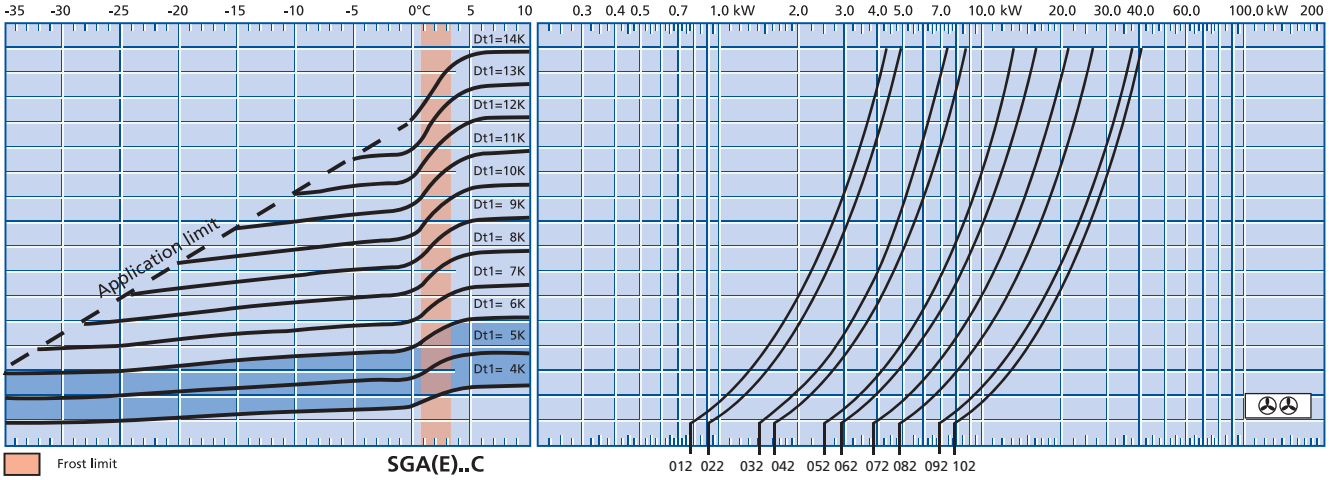
* Multiple injection with direct expansion using Küba CAL® distributors. The cooler rating at 60 Hz is 10% higher on average due to the higher speed and higher air flow.

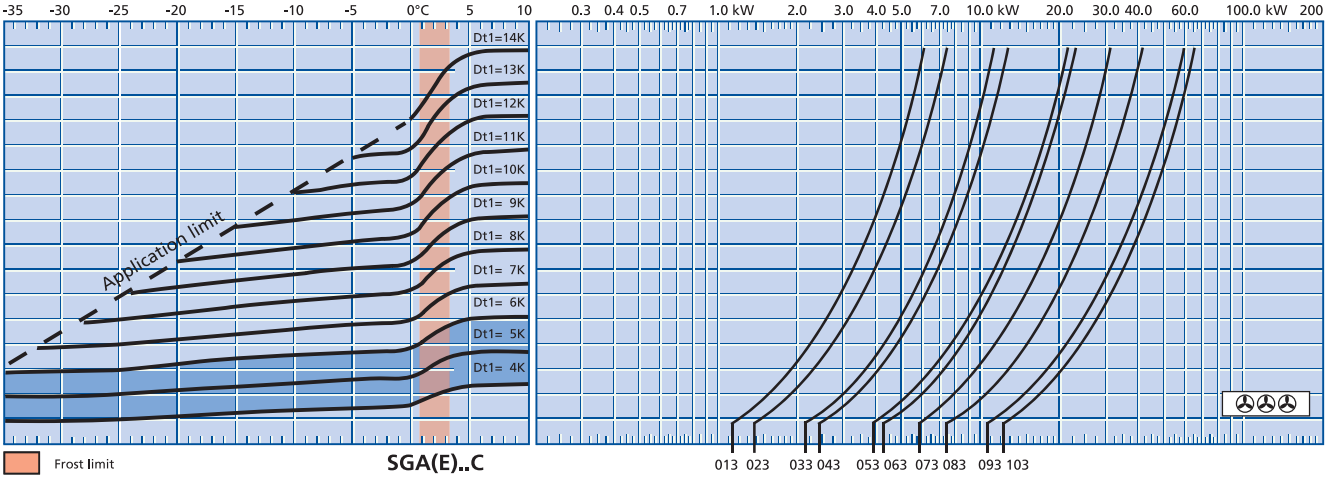
Q_V chart (EN328, R404A) SGA...C 4,5 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity







Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.

Technical data (R404A) SGB...C

7 mm

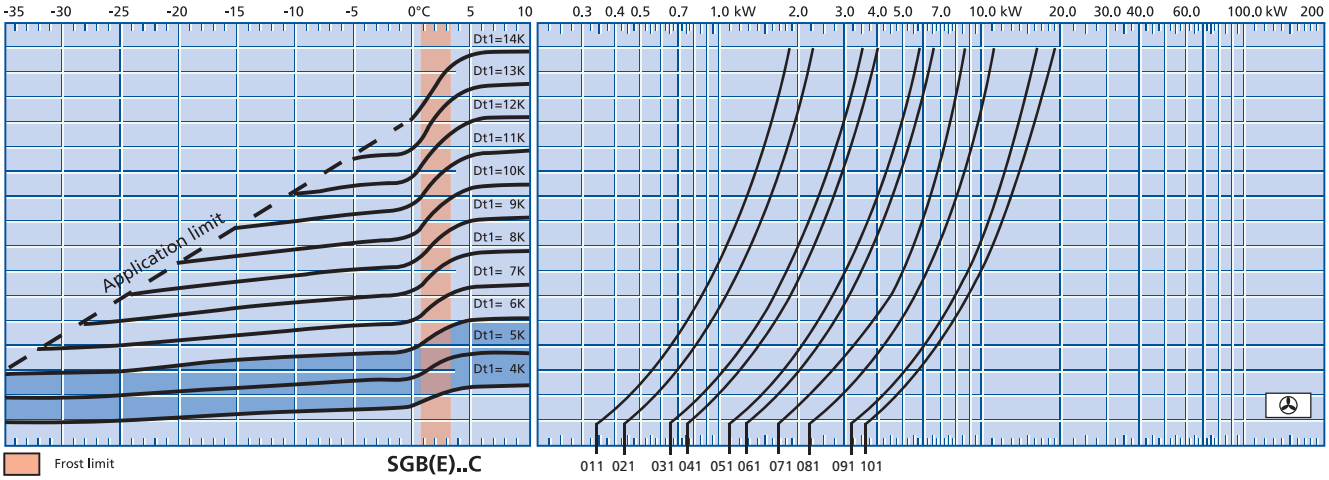
Model		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Connections Blade	Type of current	Fans (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm		min⁻¹	W	A
SGB 011C	✇	0,91	0,72	4,9	700	8	1,3	10	15	250		1301	32	0,15
SGB 021C	✇	1,13	0,90	6,5	640	8	1,3	10	15	250		1301	32	0,15
SGB 031C	✇	1,74	1,37	8,2	1300	12	2,1	10	15	300		1295	86	0,38
SGB 041C	✇	2,00	1,59	11,1	1180	12	2,8	10	15	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGB 051C	✇	2,91	2,31	15,2	1770	14	3,8	10	22	400		1307	105	0,46
SGB 061C	✇	3,34	2,65	19,1	1760	14	4,8	10	22	400		1307	105	0,46
SGB 071C	✇	4,81	3,81	22,8	2800	20	5,7	10*	22	400		1362	205	0,90
SGB 081C	✇	5,98	4,74	34,1	2900	20	8,8	10*	28	400		1362	205	0,90
SGB 091C	✇	8,42	6,69	41,0	4530	26	10,6	10*	28	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGB 101C	✇	9,50	7,54	54,5	4660	26	13,6	12*	35	500		1417	360	0,86
SGB 012C	✇✇	1,82	1,44	9,5	1400	12	2,3	10	15	250		1301	32	0,15
SGB 022C	✇✇	2,27	1,79	12,7	1280	12	3,1	10	18	250		1301	32	0,15
SGB 032C	✇✇	3,47	2,75	16,3	2600	17	3,9	10	18	300		1295	86	0,38
SGB 042C	✇✇	4,00	3,17	21,7	2360	17	5,3	10	22	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGB 052C	✇✇	5,82	4,61	30,2	3540	19	7,6	10*	28	400		1307	105	0,46
SGB 062C	✇✇	6,68	5,30	37,7	3520	19	9,1	12*	28	400		1307	105	0,46
SGB 072C	✇✇	9,62	7,63	45,2	5600	28	10,6	12*	35	400		1362	205	0,90
SGB 082C	✇✇	11,94	9,47	67,7	5800	28	16,6	15*	35	400		1362	205	0,90
SGB 092C	✇✇	16,86	13,37	81,2	9060	37	19,8	15*	35	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGB 102C	✇✇	19,01	15,07	108,0	9320	37	26,1	15*	42	500		1417	360	0,86
SGB 013C	✇✇✇	2,73	2,16	14,2	2100	15	3,4	10	15	250		1301	32	0,15
SGB 023C	✇✇✇	3,40	2,69	19,1	1920	15	4,5	10	22	250		1301	32	0,15
SGB 033C	✇✇✇	5,21	4,12	24,3	3900	21	5,8	10	28	300		1295	86	0,38
SGB 043C	✇✇✇	6,00	4,76	32,5	3690	21	8,1	10*	28	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGB 053C	✇✇✇	8,73	6,92	45,1	5310	24	11,1	12*	35	400		1307	105	0,46
SGB 063C	✇✇✇	10,02	7,95	56,5	5280	24	13,1	12*	35	400		1307	105	0,46
SGB 073C	✇✇✇	14,43	11,43	67,6	8400	34	16,2	15*	35	400		1362	205	0,90
SGB 083C	✇✇✇	17,92	14,20	101,0	8700	34	24,5	22*	42	400		1362	205	0,90
SGB 093C	✇✇✇	25,29	20,07	122,0	13600	45	29,6	22*	54	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGB 103C	✇✇✇	28,50	22,61	162,0	14000	45	38,5	22*	54	500		1417	360	0,86

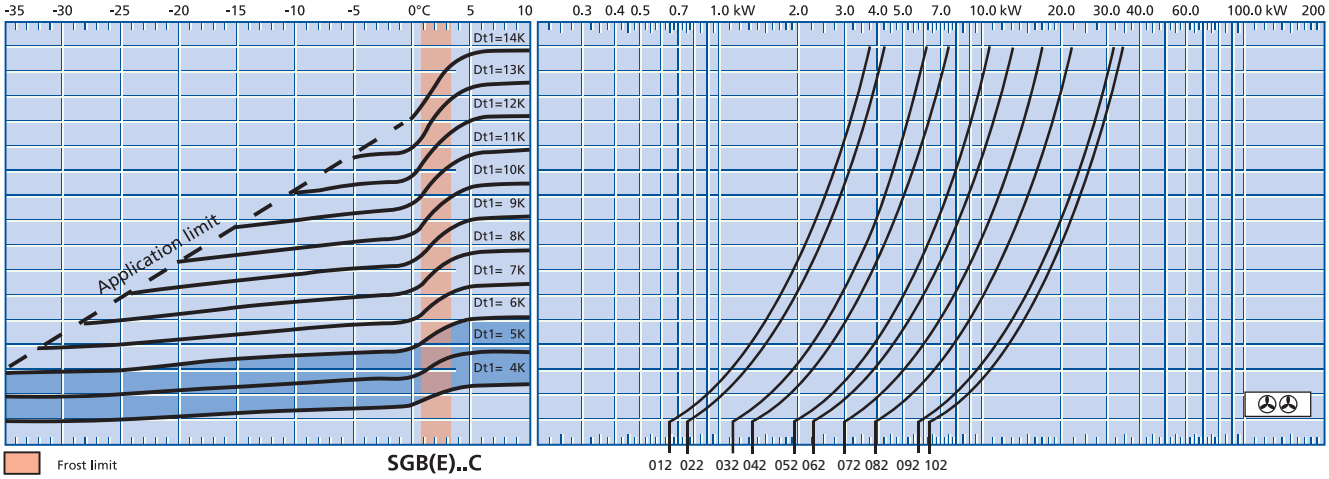
* Multiple injection with direct expansion using Küba CAL® distributors. The cooler rating at 60 Hz is 10% higher on average due to the higher speed and higher air flow.

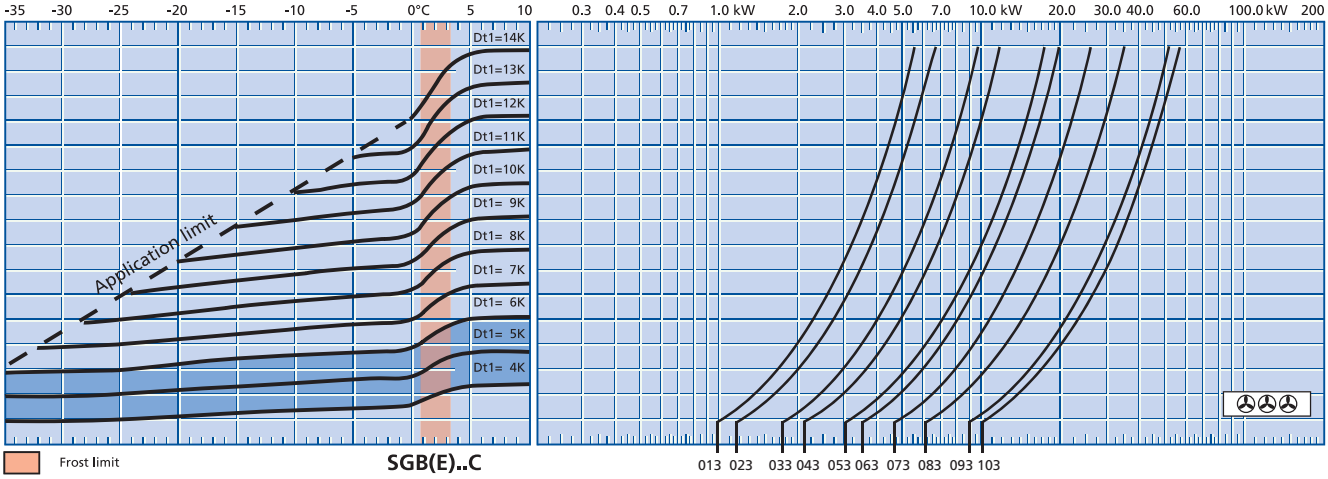
Q_V chart (EN328, R404A) SGB...C 7 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity







Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.

Technical data (R404A) SGL...C

12 mm

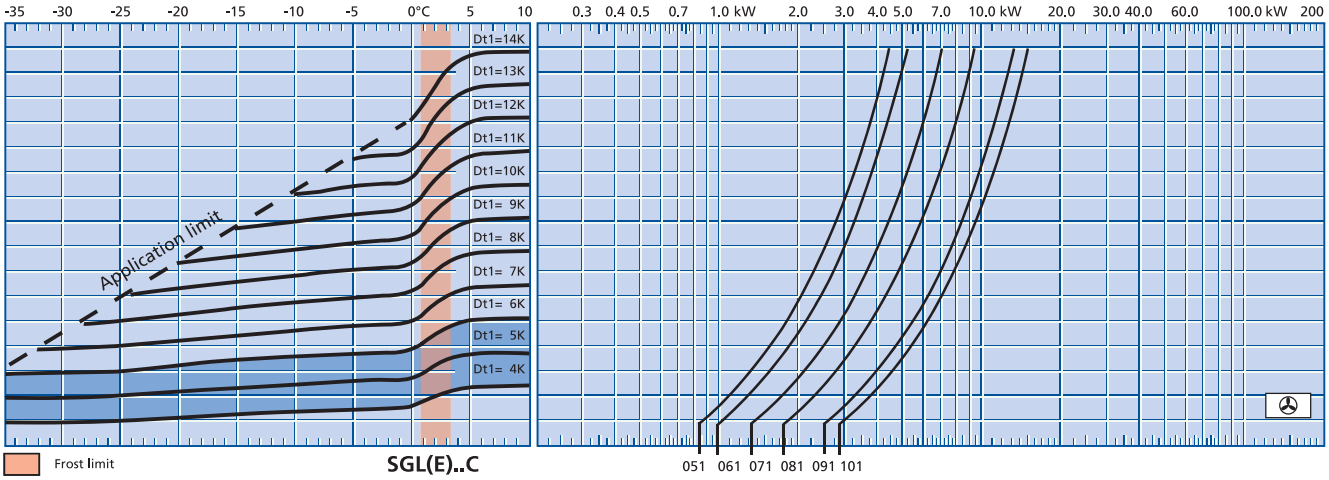
Model		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Connections Blade	Type of current	Fans (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm		min⁻¹	W	A
SGL 051C	✇	2,20	1,74	9,5	1910	15	3,8	10	22	400	230±10% V-1~ 50/60 Hz	1307	105	0,46
SGL 061C	✇	2,60	2,06	11,8	1900	15	4,8	10	22	400		1307	105	0,46
SGL 071C	✇	3,69	2,92	14,1	3020	21	5,7	10*	22	400		1362	205	0,90
SGL 081C	✇	4,70	3,73	21,1	3060	21	8,8	10*	28	400		1362	205	0,90
SGL 091C	✇	6,58	5,21	25,2	4890	28	10,6	10*	28	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGL 101C	✇	7,48	5,93	33,5	5020	28	13,6	12*	35	500		1417	360	0,86
SGL 012C	✇✇	1,45	1,15	5,9	1610	14	2,3	10	15	250		1301	32	0,15
SGL 022C	✇✇	1,75	1,39	8,0	1470	14	3,1	10	18	250		1301	32	0,15
SGL 032C	✇✇	2,55	2,02	10,1	2990	19	3,9	10	18	300		1295	86	0,38
SGL 042C	✇✇	3,09	2,45	13,5	2710	19	5,3	10	22	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGL 052C	✇✇	4,40	3,49	18,5	3820	21	7,6	10*	28	400		1307	105	0,46
SGL 062C	✇✇	5,21	4,13	23,2	3800	21	9,1	12*	28	400		1307	105	0,46
SGL 072C	✇✇	7,38	5,84	27,8	5440	30	10,6	12*	35	400		1362	205	0,90
SGL 082C	✇✇	9,39	7,45	41,5	6260	30	16,2	15*	35	400		1362	205	0,90
SGL 092C	✇✇	13,14	10,41	50,0	9780	40	19,8	15*	35	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGL 102C	✇✇	14,95	11,85	66,3	10000	40	26,1	15*	42	500		1417	360	0,86
SGL 013C	✇✇✇	2,17	1,72	8,7	2410	17	3,4	10	15	250		1301	32	0,15
SGL 023C	✇✇✇	2,63	2,08	11,6	2210	17	4,5	10	22	250		1301	32	0,15
SGL 033C	✇✇✇	3,82	3,03	15,0	4490	24	5,8	10	28	300		1295	86	0,38
SGL 043C	✇✇✇	4,63	3,67	20,0	4240	24	8,1	10*	28	300	230±10% V-1~ 50/60 Hz	1295	86	0,38
SGL 053C	✇✇✇	6,61	5,23	27,7	5730	26	11,0	12*	35	400		1307	105	0,46
SGL 063C	✇✇✇	7,81	6,19	34,6	5700	26	13,1	12*	35	400		1307	105	0,46
SGL 073C	✇✇✇	11,05	8,75	41,3	9070	37	16,2	15*	35	400		1362	205	0,90
SGL 083C	✇✇✇	14,10	11,17	62,1	9400	37	24,5	22*	42	400		1362	205	0,90
SGL 093C	✇✇✇	19,72	15,63	74,5	14700	49	29,6	22*	54	500	230/400 ±10%V-3~ 50/60 Hz	1417	360	0,86
SGL 103C	✇✇✇	22,43	17,77	99,1	15100	49	38,5	22*	54	500		1417	360	0,86

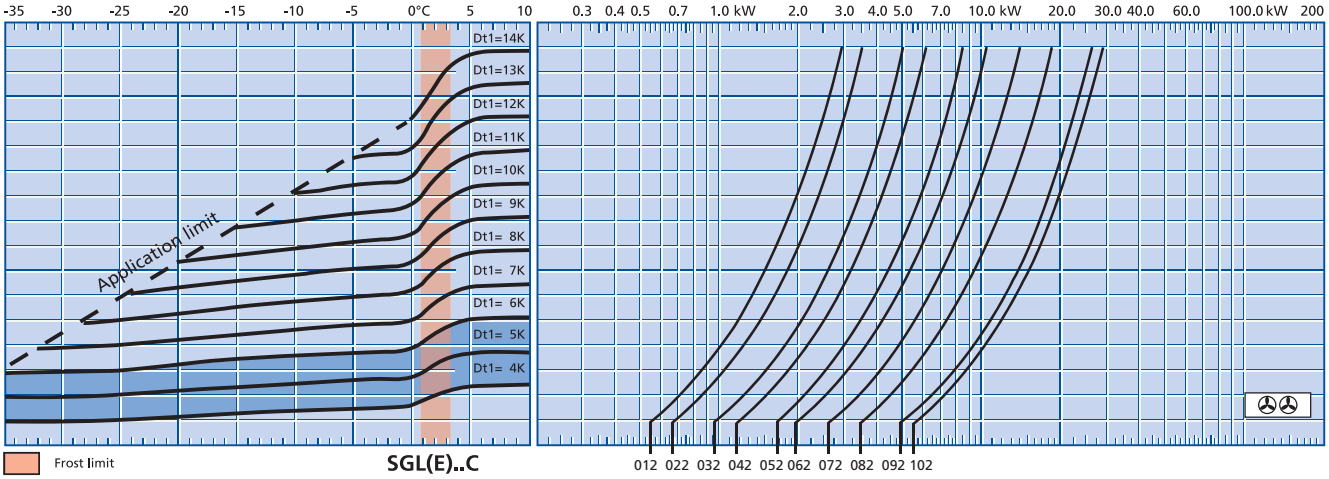
* Multiple injection with direct expansion using Küba CAL® distributors. The cooler rating at 60 Hz is 10% higher on average due to the higher speed and higher air flow.

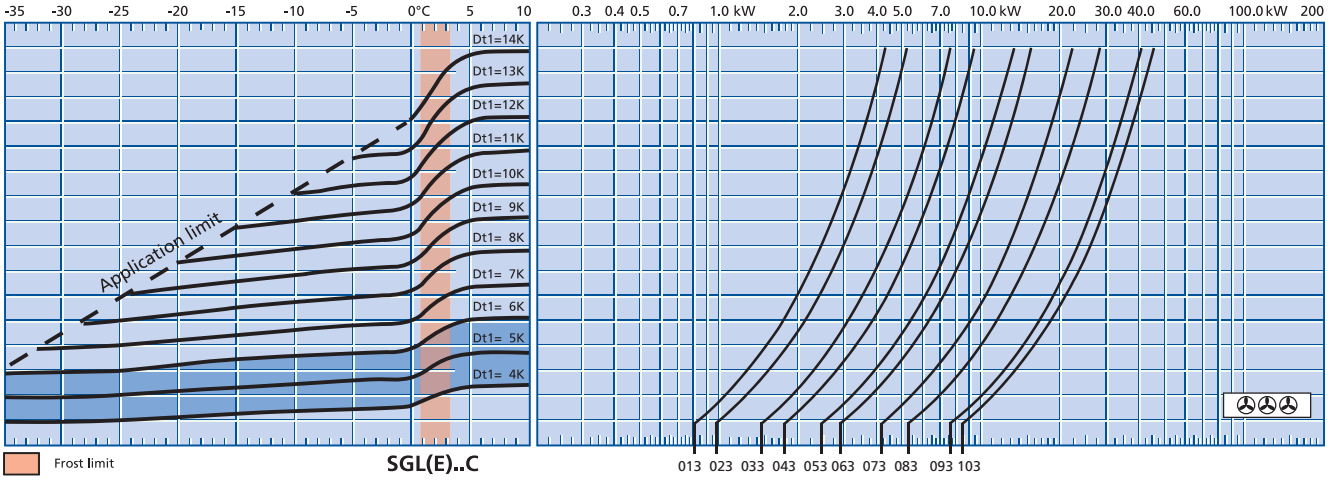
Q_V chart (EN328, R404A) SGL...C 12 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity





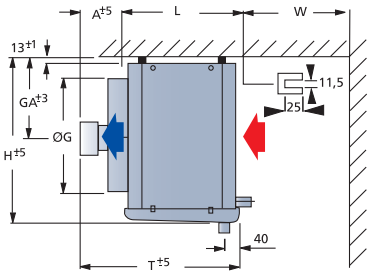


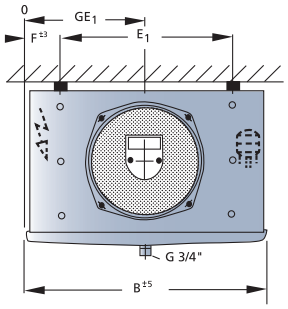
Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

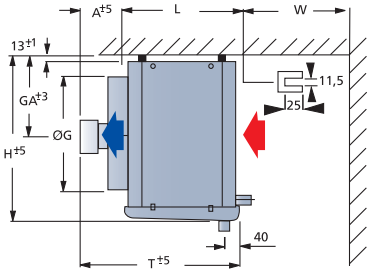
DT1 = 4 K bis 6 K
with electronic expansion valve

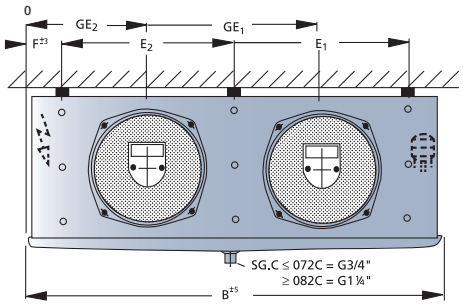
Example selection:
For example and explanation, see the information section on p. 136.

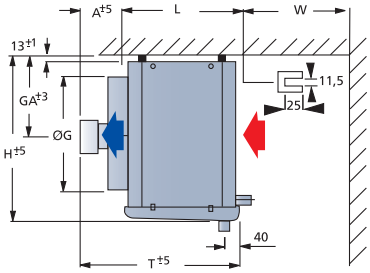
Dimensional drawings

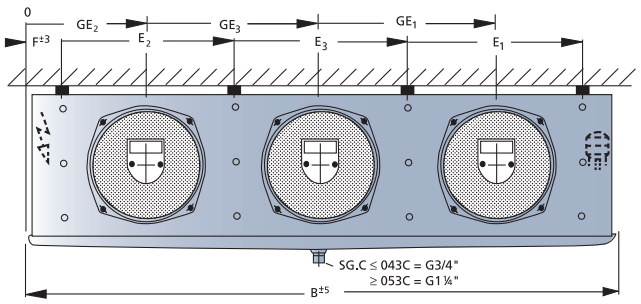












With double, insulated drip trays the following dimensions are changed:
Width B: +60 mm
Height H: +30 mm
Depth T: +30 mm

Sound power level L_{WA} [dB(A)]

	SGA/SGB/SGL		
Größe	✇	✇ ✇	✇ ✇ ✇
01	59	62	64
02	59	62	64
03	66	69	71
04	66	69	71
05	70	73	75
06	70	73	75
07	75	78	80
08	75	78	80
09	78	81	83
10	78	81	83

Dimensional drawings, electric defrosting, weights

	Dimensions [mm]																Electrical Defrosting			Net weight		
Size	H	B	T	L	E_1	E_2	E_3	F	A	W	W Hood	ØG	GA	GE_1	GE_2	GE_3	Coil	Tray	Total	SGA	SGB	SGL
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kW	kW	kW	kg	kg	kg
011C	360	565	420	345	380	-	-	93	80	200	290	265	160	283	-	-	0,77	0,35	1,16	12	11	-
021C	360	565	420	345	380	-	-	93	80	200	290	265	160	283	-	-	0,77	0,35	1,16	13	12	-
031C	460	665	440	345	480	-	-	93	100	200	340	321	210	333	-	-	0,96	0,42	1,38	18	17	-
041C	460	665	440	345	480	-	-	93	100	200	340	321	210	333	-	-	0,96	0,42	1,38	20	19	-
051C	560	815	570	415	530	-	-	143	160	300	430	419	260	408	-	-	1,44	0,24	1,68	30	29	28
061C	560	815	570	415	530	-	-	143	160	300	430	419	260	408	-	-	1,61	0,24	1,85	33	32	30
071C	560	915	640	495	630	-	-	143	150	300	430	419	260	458	-	-	1,73	0,29	2,02	41	39	37
081C	560	1065	640	495	780	-	-	143	150	300	430	419	260	533	-	-	2,18	0,35	2,53	53	51	49
091C	660	1065	650	495	780	-	-	143	160	400	500	525	320	533	-	-	2,90	0,35	3,25	62	59	56
101C	660	1315	650	495	1030	-	-	143	160	400	500	525	320	658	-	-	3,68	0,44	4,12	71	68	65
012C	360	1015	420	345	730	365	-	143	80	200	290	265	160	690	325	-	1,38	0,69	2,07	23	21	19
022C	360	1015	420	345	730	365	-	143	80	200	290	265	160	690	325	-	1,38	0,69	2,07	24	22	20
032C	460	1215	440	345	930	465	-	143	100	200	340	321	210	840	375	-	1,72	0,77	2,49	35	33	31
042C	460	1215	440	345	930	465	-	143	100	200	340	321	210	840	375	-	1,72	0,77	2,49	39	37	35
052C	560	1375	570	415	1030	515	-	173	160	300	430	419	260	945	430	-	2,64	0,44	3,08	58	55	53
062C	560	1375	570	415	1030	515	-	173	160	300	430	419	260	945	430	-	2,64	0,44	3,08	64	61	58
072C	560	1575	640	495	1230	615	-	173	150	300	430	419	260	1095	480	-	3,11	0,52	3,63	80	76	72
082C	560	1875	640	495	1530	765	-	173	150	300	430	419	260	1320	555	-	3,90	0,65	4,55	104	100	96
092C	660	1875	650	495	1530	765	-	173	160	400	500	525	320	1320	555	-	6,50	0,65	7,15	120	114	108
102C	660	2375	650	495	2030	1015	-	173	160	400	500	525	320	1695	680	-	8,42	0,84	9,27	137	130	123
013C	360	1365	420	345	1080	365	715	143	80	200	290	265	160	1040	325	683	1,84	0,92	2,76	34	31	28
023C	360	1365	420	345	1080	365	715	143	80	200	290	265	160	1040	325	683	1,84	0,92	2,76	37	34	31
033C	460	1665	440	345	1380	465	915	143	100	200	340	321	210	1290	375	833	2,42	1,21	3,63	51	48	45
043C	460	1665	440	345	1380	465	915	143	100	200	340	321	210	1290	375	833	2,42	1,21	3,63	57	54	51
053C	560	1875	570	415	1530	515	1015	173	160	300	430	419	260	1445	430	938	3,90	0,65	4,55	86	81	76
063C	560	1875	570	415	1530	515	1015	173	160	300	430	419	260	1445	430	938	3,90	0,65	4,55	95	90	85
073C	560	2175	640	495	1830	615	1215	173	150	300	430	419	260	1695	480	1088	4,47	0,75	5,22	118	111	104
083C	560	2625	640	495	2280	765	1515	173	150	300	430	419	260	2070	555	1313	5,63	0,94	6,57	154	147	140
093C	660	2625	650	495	2280	765	1515	173	160	400	500	525	320	2070	555	1313	9,37	0,94	10,32	180	170	160
103C	660	3375	650	495	3030	1015	2015	173	160	400	500	525	320	2695	680	1688	12,09	1,82	13,92	240	228	216

The dimensions are only valid for standard model design!
Note the differences in dimension for versions and accessories.

Models

Motor versions

- **Version V1.33 – quiet design**
  Particularly suited for sales areas, etc.
  - Reduced air flow rate, VL
  - Lower sound power level, Lw (A)
  - Fans 230 ± 10% V-1~

For other alternative motor versions, see Küba Select or version overview, p. 126

Water / brine circulation

- **Version V2.05**
  Large number of circuits (small pressure drop)

- **Version V2.06**
  Small number of circuits (large pressure drop)

Casing versions

Double insulated drip tray

- **V3.09**

The double insulated drip tray has 25 mm of insulation.

The insulation prevents condensation water from building up on the bottom side of the tray and reduces the transfer of defrosting heat into the Cold Room.

This changes the following dimensions:

Width B: +60 mm
Hight H: +30 mm
Depth T: +30 mm

Hinged fans

- **V3.10**

To make the coolers easy to clean, the fans are mounted with stainless steel hinges.

Hinge-down drip tray

- **V3.11**

The hinge-down drip tray is easy to assemble and makes it easy to clean the devices from below.

Defrost versions

All Küba Air Coolers are available with electric defrosting. See nomenclature, p. 48

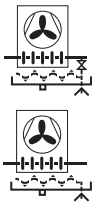
Hot gas defrost in the drip tray

- Hot gas connection on both sides
- V4.01 Copper design
- V4.02 Stainless steel design

Hot gas in the heat exchanger

- V6.05 Hot gas connection on the heat exchanger

Hot gas in the heat exchanger and in the drip tray, copper design
Copper with / without check valve



- Hot gas connection on both sides
- V6.07 with check valve
- V6.08 without check valve

On request: additional defrosting circuit: warm brine; the circuit is integrated into the heat exchanger.

Corrosion protection

Stainless steel casing

- **V3.12**

For protection in aggressive cold storage air, e.g. in smokehouses and curing areas, all casing components are stainless steel. Industrial quality.

- **Version V6.01**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al protective coating on both sides

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on both sides

Models

- **Version V6.02**

Heat exchanger:
Tubing: Stainless steel
Fins: „goldlack“ coating
End plates: Stainless steel

Casing: Al-stucco.
Top Panel: Sendzimir galvanised steel, protective coating on both sides
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **Version V6.03**

Heat exchanger:
Tubing: Stainless steel
Fins: Al
End plates: Al

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on one side
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **Version V6.04**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al

Casing: Al-Stucco.
Top Panel: Sendzimir galvanised steel, protective coating on one side

Further information regarding corrosion protection can be found on pages 132 to 135

Accessories

Adapter for textile hose connection and Shut-Up®

With the adapter (aluminium, powder-coated RAL 9018) mounting a PVC or textile hose and the Küba Shut-Up® quick and easy.

Straightener design: plastic (not suitable for fan collar heaters)

Selection table

For Air Coolers	Adapter		Note
	Quantity	ØG mm	
SG 011-021C	1	270	
SG 031-041C	1	325	
SG 051-061C	1	425	
SG 071-081C	1	425	
SG 091-101C	1	525	
SG 012-022C	2	270	
SG 032-042C	2	325	Not assembled upon delivery (cannot be used with electric defrosting SGHR)
SG 052-062C	2	425	
SG 072-082C	2	425	
SG 092-102C	2	525	
SG 013-023C	3	270	
SG 033-043C	3	325	
SG 053-063C	3	425	
SG 073-083C	3	425	
SG 093-103C	3	525	

For greater pressure drops we recommend using more powerful fans. When using textile or PVC hoses, take the Ø G (mm) in the selection table into consideration. For more information, contact our sales engineers, Tel.: ++49 (0)89 / 74473-0. For more detailed information, please see the information provided by the textile or PVC hose manufacturer.

Fan unit for assembling fan collar heaters

This fan unit (collar made of aluminium, powder-coated RAL 9018) is used to assemble a fan collar heater.

Fan design: suitable for use with fan collar heaters

Applications

- Assembling fan collar heaters for deep-freezing starting at -18 °C

If fan collar heaters are used for a deep-freeze application, a fan with an aluminium collar must be used instead of the standard fan unit. Please note this circumstance in planning.

Scope of delivery

Complete fan unit consisting of:

Collar:	Al Stucco, white powder-coated RAL 9018 Food quality Good protection against corrosion
Air Straightener:	Plastic
Motor and blade:	As for standard

Accessories

Recommended for frozen storage

- Shut-Up®
- Defrost hood
- Fan collar heaters
- Double insulated drip tray
- Insulate the top panel on site

Shut-Up®

The Küba Shut-Up® optimises the defrost process, particularly in deep-freeze applications.

Applications
- Frozen storage starting at -18 °C
- Alternating defrosting of the Air Coolers in one room

Advantages (in connection with the defrosting hood)
With Shut-Up® and the defrost hood, a positive accumulation of heat occurs in the air cooler during the defrost process. The heat remains in the cooler, which means:
- Defrost times reduced by more than 50 %
- Significant amounts of energy saved
- No frost build-up on the ceiling of the storage room or on the goods due to minimal vapour build-up
- Defrost temperature in cooler is ≦5 °C

Calculation hint
Due to the additional external pressure, the air quantity and air cooler capacity change:

Model	Change in air quantity	Change in rating
SG *commercial*	-10%	-5%

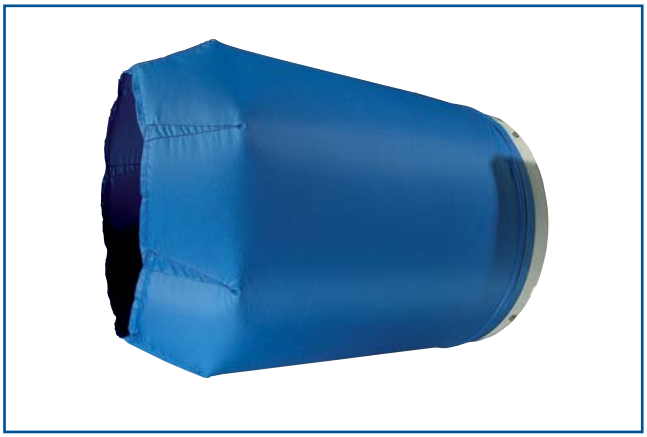
Selection table

for model		Shut-Up®
SG...	✇	1 piece
SG...	✇ ✇	2 pieces
SG...	✇ ✇ ✇	3 pieces

Please plan to use an adapter.
Shut-Up® is not assembled upon delivery.

Note:
Shut-Up®s length =
Ø Flange for textile sock connection x 1,2

Please take the adapter´s length into account.



Cooling phase, fans switched on: Shut-Up® is inflated

Defrosting, fans switched off: Shut-Up® closes the air cooler

Accessories

Defrost hood

The defrosting hood optimises the defrost process, particularly in deep-freeze applications.

Applications

- Frozen storage starting at -18 °C
- Alternating defrosting of the Air Coolers in one room

Advantages (in connection with Shut-Up®)

With the defrost hood and Shut-Up® a positive accumulation of heat occurs in the air cooler during the defrost process. The heat remains in the cooler, which means:

- Defrost times reduced by more than 50%
- Significant amounts of energy saved
- No frost build-up on the ceiling of the storage room or on the goods due to minimal vapour build-up
- Defrost temperature in cooler is ≦5°C

Construction

- The defrosting hood consists of 6 mm of thick expanded polycarbonate
- To a large extent, the insulated plastic prevents temperatures from falling below the dew point and the related formation of ice.
- The material is temperature resistant from -100 °C to +140 °C
- Results of endurance tests with regard to contact with foodstuffs are available.
- The defrosting hoods are delivered as a kit for every fan module and can be assembled on site according to the enclosed assembly instructions
- Please note the minimum wall clearance „W_{min}“

Module dimensions and weight:

Model	H mm	B mm	T mm	Weight kg	$W_{min.}$ mm
SG 11-23	600	352	270	1,8	290
SG 31-14	700	452	340	2,5	340
SG 51-63	800	502	410	3,0	430
SG 71-73	800	602	410	3,4	430
SG 81-83	800	752	410	4,1	430
SG 91-93	900	752	480	4,5	500
SG 101-103	900	1002	480	5,6	500

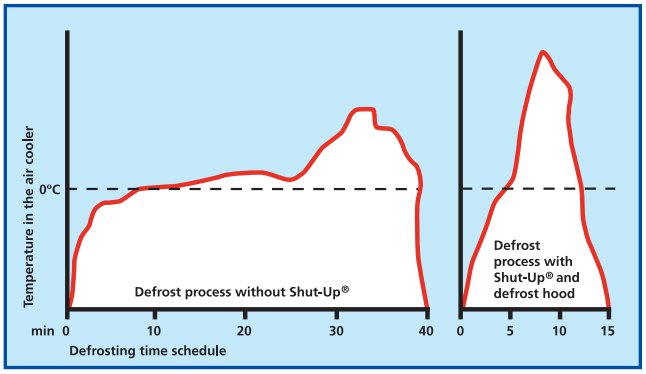
Calculation hint

Due to the additional external pressure, the air quantity and air cooler capacity change:

Model	Change in air quantity	Change in rating
SG *commercial*	-10%	-5%

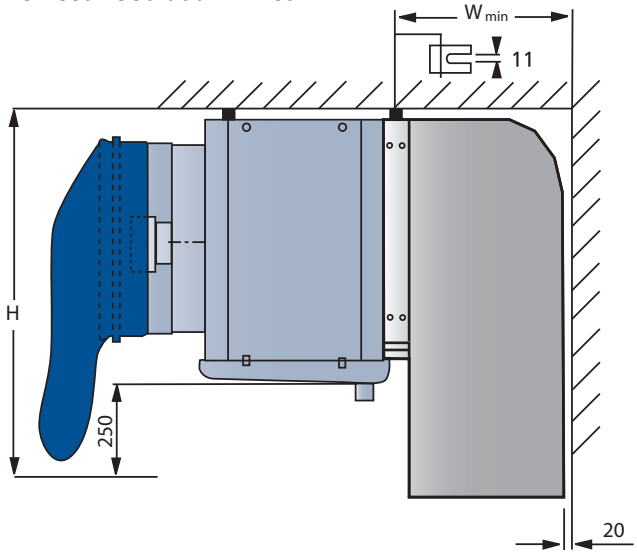
For deep-freeze applications, Küba engineers recommend an insulated drip tray.

Defrosting process with Shut-Up® and defrost hood



Defrost time reduced by more than half

Defrost hood at air inlet



Accessories

Fan collar heater VRB

Benefits:
Prevents the fan blade at the collar from freezing up (in cases of extreme humidity in the freezer and frozen storage area)

Scope of delivery:
Electric tubular heater with stainless steel sleeve Ø 8,5 mm
Connection ends: 1,5 x 2000 mm
Tension spring: stainless steel

Technical data

Model	for blade	Nominal rating at 230 V	Ø mm	Weight
	mm	kW	D_i	kg
VRB 25	250	0,31	270	0,35
VRB 30	300	0,39	325	0,40
VRB 40	400	0,48	425	0,50
VRB 50	500	0,27	525	0,55

Selection table

For Air Coolers	VRB	Model	Connection power / cooler
	Quantity	Designation	kW
SG 011, 021C	1	VRB 25	0,31
SG 031, 041C	1	VRB 30	0,39
SG 051, 061C	1	VRB 40	0,48
SG 071, 081C	1	VRB 40	0,48
SG 091, 101C	1	VRB 50	0,27
SG 012, 022C	2	VRB 25	0,62
SG 032, 042C	2	VRB 30	0,78
SG 052, 062C	2	VRB 40	0,96
SG 072, 082C	2	VRB 40	0,96
SG 092, 102C	2	VRB 50	0,54
SG 013, 023C	3	VRB 25	0,93
SG 033, 043C	3	VRB 30	1,17
SG 053, 063C	3	VRB 40	1,44
SG 073, 083C	3	VRB 40	1,44
SG 093, 103C	3	VRB 50	0,81

Fan collar heater cover

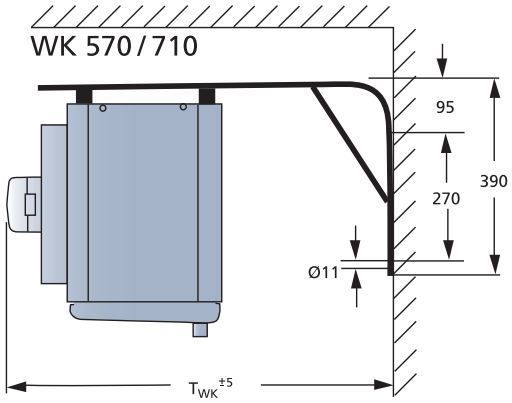
Benefits:
- Contact protection
- Reduces heat radiation from the fan collar heaters into the Cold Room
- Improves heat conductivity at the collar
- Increases the efficiency of the fan collar heaters
- Protects against slipping

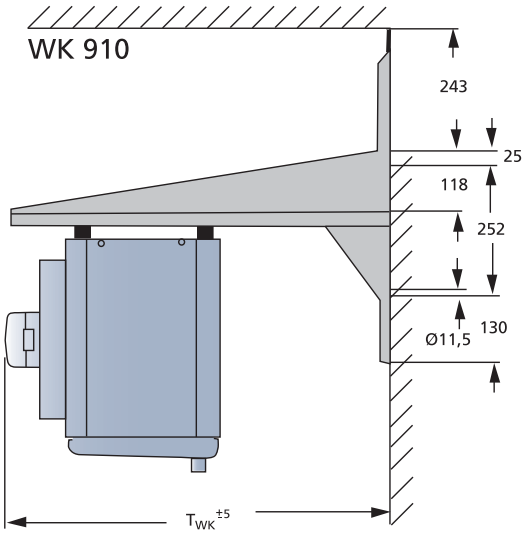
Only available in connection with a metal air duct; fan unit for assembling a fan collar heater VRB, page 58!

Accessories

Mounting material, wall bracket / floor bracket

Wall bracket (WK)

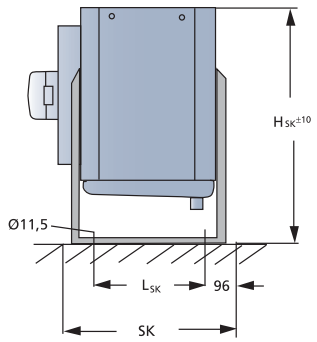


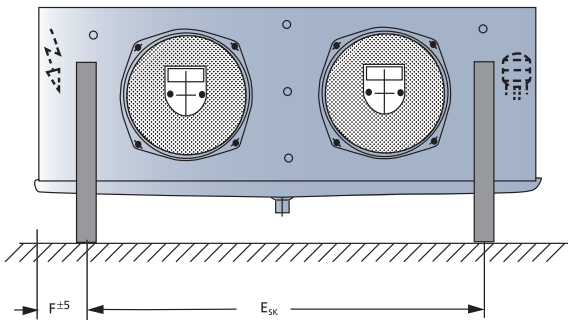


Design: Galvanised steel

SG.	011-013C	021-023C	031-033C	041-043C	051-053C	061-063C	071-073C	081-083C	091-093C	101-103C
WK	570	570	570	570	710	710	910	910	910	910
T_{WK} [mm]	615	615	635	635	835	835	1000	1000	1010	1010

Floor brackets (SK)





Design: SK 460, 510 = Al

SG.		051-053C	061-063C	071-073C	081-083C	091-093C	101-103C
SK		460	460	460	460	510	510
Dimensions [mm]	SK	460	460	460	460	510	510
	H_{SK}	685	685	785	785	785	785
	L_{SK}	478	478	558	558	558	558
	E_{SK} }	≙ E1 und F					
	F }	≙ According to dimension table p. 55					

No floor mounting brackets are available for SG. 011 - 043C.

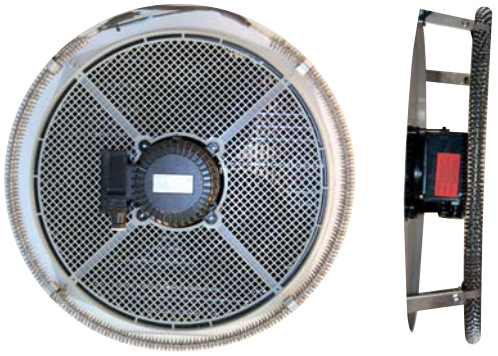
Accessories

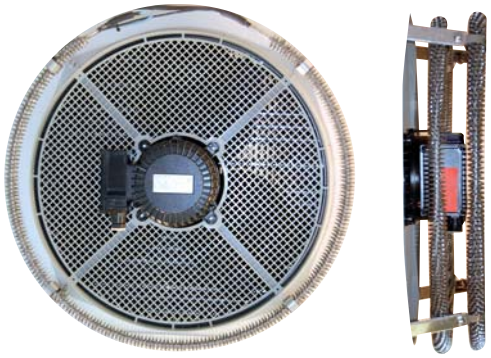
Finned tube heaters SGHR

For Air Coolers with draw-through fans, on site assembly.
Suitable for air conditioning or heating in winter.

Only for use with running air cooler fans so that the ceiling of the cold storage areas does not overheat. Please observe the respective safety guidelines.

Scope of delivery:
- Electric finned tube heater in stainless steel
- Connection ends: 1,5 x 2000 mm
- Assembly kit
- Connection box IP 54





Normal construction version				Additional heater for greater heating capacity		
Model	for blade Ø mm	Nominal rating at 230 V kW	Weight kg	Model	Nominal rating at 230 V kW	Weight kg
SGHR 25	250	1,36	0,65	**SGHR 25 Z**	1,36	0,65
SGHR 30	300	1,75	0,75	**SGHR 30 Z**	1,75	0,75
SGHR 40	400	2,47	0,94	**SGHR 40 Z**	2,47	0,94
SGHR 50	500	3,19	1,13	**SGHR 50 Z**	3,19	1,13

For Air Coolers	Normal heating capacity		Greater heating capacity	
	kW	Number to order	kW	Number to order
SG 011, 021C	1,36	1 SGHR 25	2,72	1 SGHR 25 + 1 SGHR 25 Z
SG 031, 041C	1,75	1 SGHR 30	3,50	1 SGHR 30 + 1 SGHR 30 Z
SG 051, 061C	2,47	1 SGHR 40	4,94	1 SGHR 40 + 1 SGHR 40 Z
SG 071, 081C	2,47	1 SGHR 40	4,94	1 SGHR 40 + 1 SGHR 40 Z
SG 091, 101C	3,19	1 SGHR 50	6,28	1 SGHR 50 + 1 SGHR 50 Z
SG 012, 022C	2,72	2 SGHR 25	5,44	2 SGHR 25 + 2 SGHR 25 Z
SG 032, 042C	3,50	2 SGHR 30	7,00	2 SGHR 30 + 2 SGHR 30 Z
SG 052, 062C	4,94	2 SGHR 40	9,88	2 SGHR 40 + 2 SGHR 40 Z
SG 072, 082C	4,94	2 SGHR 40	9,88	2 SGHR 40 + 2 SGHR 40 Z
SG 092, 102C	6,38	2 SGHR 50	12,76	2 SGHR 50 + 2 SGHR 50 Z
SG 013, 023C	4,08	3 SGHR 25	8,16	3 SGHR 25 + 3 SGHR 25 Z
SG 033, 043C	5,25	3 SGHR 30	10,50	3 SGHR 30 + 3 SGHR 30 Z
SG 053, 063C	7,41	3 SGHR 40	14,82	3 SGHR 40 + 3 SGHR 40 Z
SG 073, 083C	7,41	3 SGHR 40	14,82	3 SGHR 40 + 3 SGHR 40 Z
SG 093, 103C	9,57	3 SGHR 50	19,14	3 SGHR 50 + 3 SGHR 50 Z

Accessories

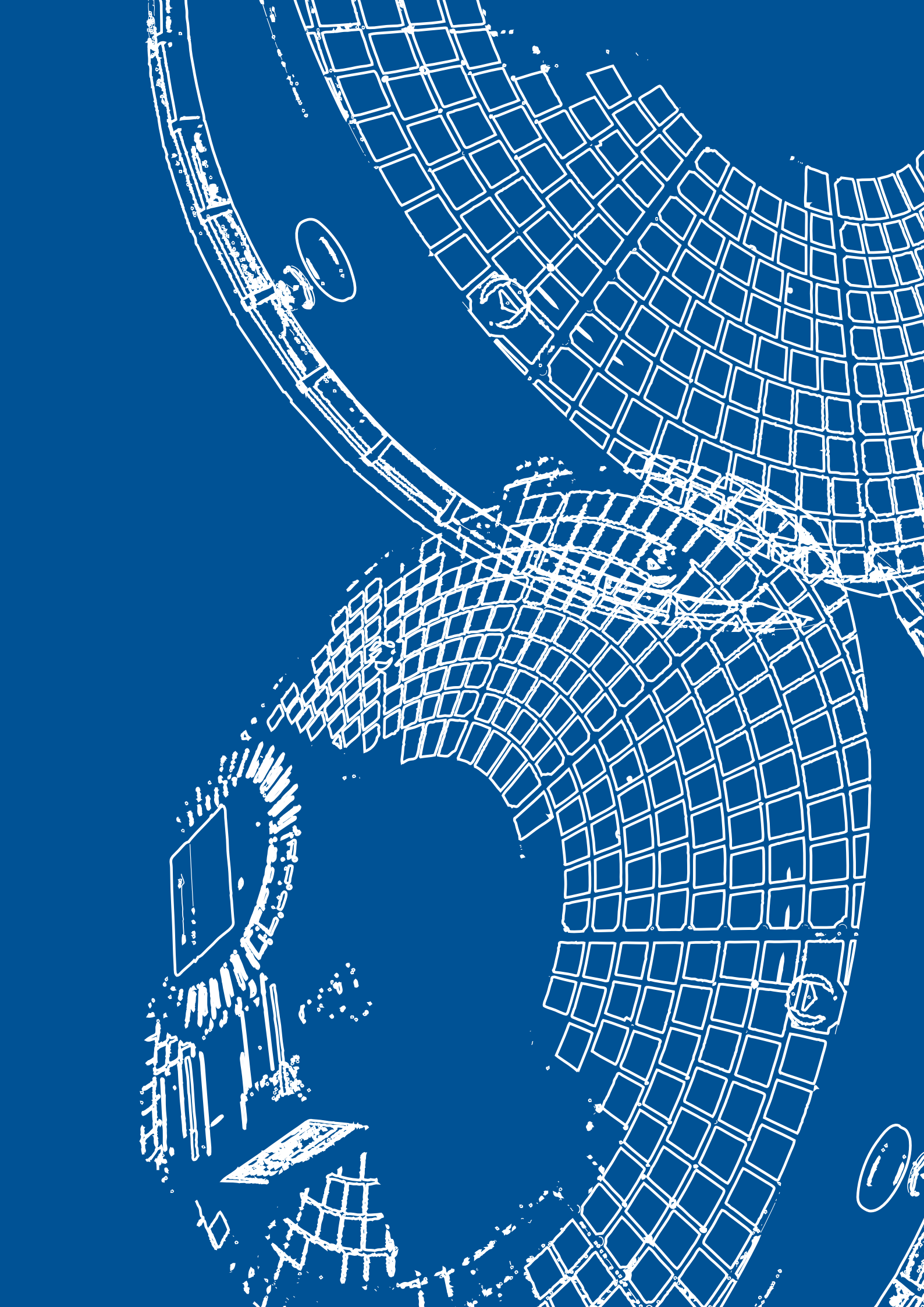
Air hoses (on site procurement, not available from Küba)

Ventilation can be optimised with textile / PVC air hoses.

Applications
- Applications in work and production areas
- Cooled goods that are sensitive to drafts (e.g. flowers, ripening cheeses)

Advantages
The air hoses make uniform air distribution possible at very low air speeds.
- Working in a draft-free environment yields low illness rates
- Maximum protection for sensitive cooled goods
- No condensation water: temperatures do not fall below the dew point because air can penetrate the woven material

Calculation hint
Please order the corresponding adapter (see page 58). Please take the respective pressure drop for the cooler rating into consideration.

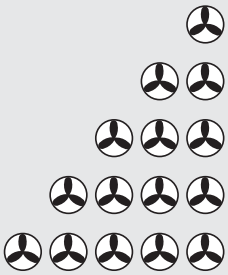


Küba SG *industrial*

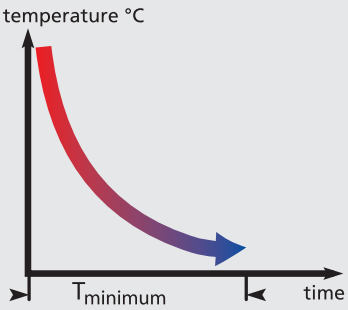
Küba SG *industrial*: Specific advantages

The Küba SG *industrial* is a master of customisation. No matter how great the demand for power, the Küba SG *industrial* is the answer. Its versatility allows the Küba SG *industrial* to master the most complex refrigeration tasks.

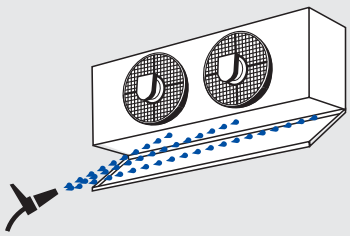
Q_0 5 ▬ ▬ ▬ 170 kW



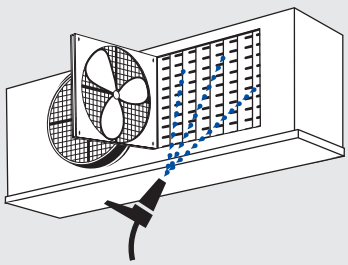
The Küba SG *industrial*'s enormous air volume and directed air flow achieve maximum cooling and freezing speeds.



Even the standard design includes the hinge-down drip tray. This makes it easy to clean the cooler and it is easy to assemble to make service work easy.



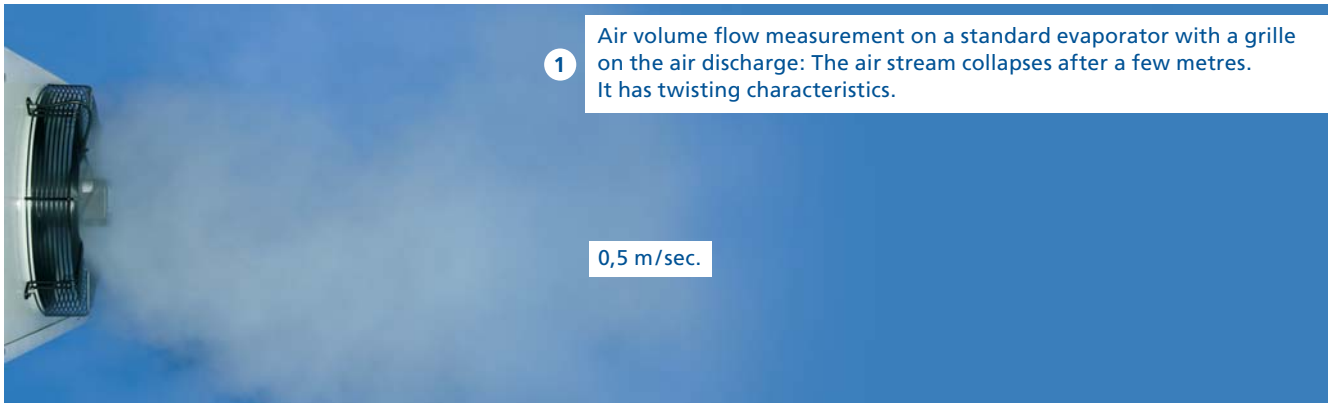
To clean the heat exchanger, hinged fans are optional. This allows easy access to the heat exchanger.



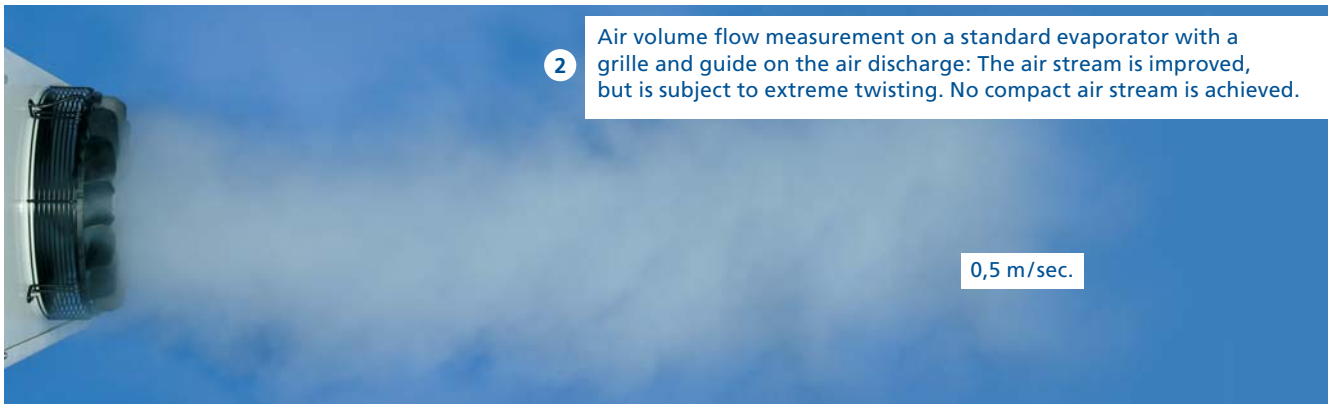
Küba SG *industrial*: Specific advantages

What are the effects of a long air throw range?

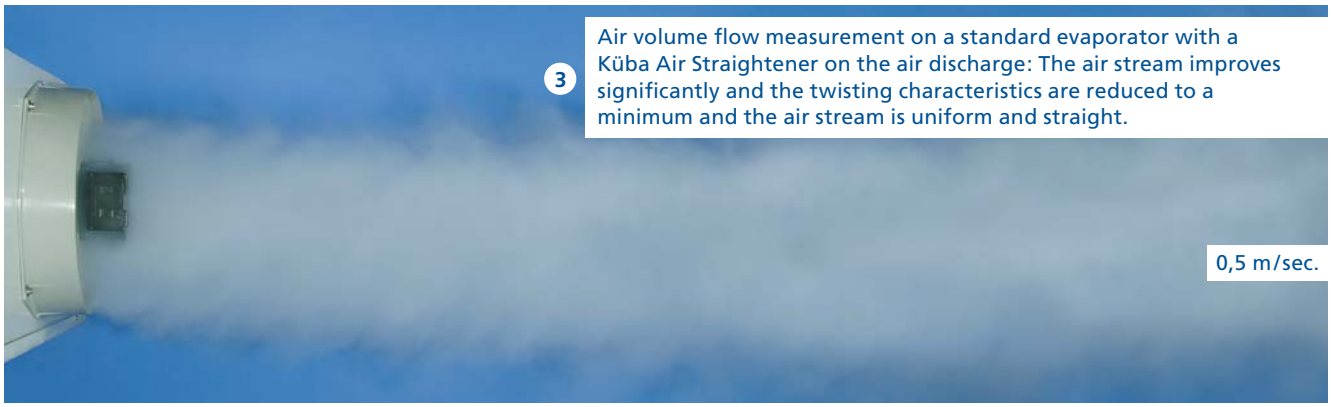
Grille



Grille and guide-wheel



Küba Air Straighteners



The illustration shows the Küba SG *commercial* line.
The illustrations also apply to the Küba SG *industrial* line.

Air throw comparison at a nominal capacity of 5.95 kW

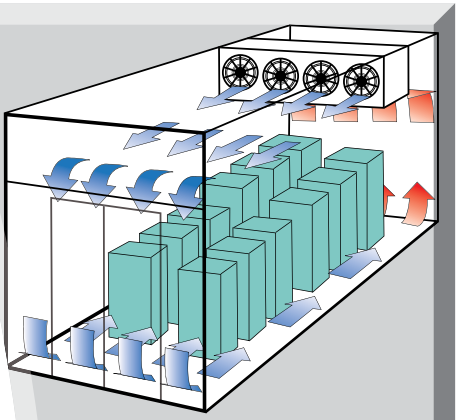
Küba SG *industrial*: Specific advantages

Goods stay at a uniform temperature due to improved air distribution

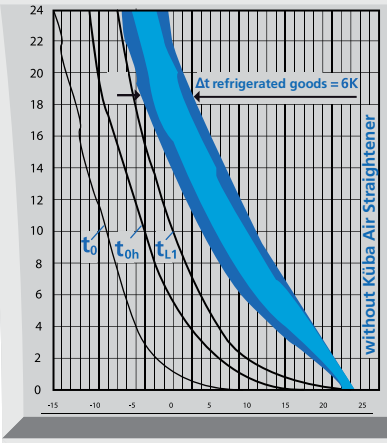
Refrigeration in large, long cold storage areas can be effected with Küba Air Coolers. Very long throw ranges can be achieved with the air straighteners. This allows the chilled air to reach the most remote corners of the cold storage area. In connection with the product specific stacking, room ventilation is trouble-free. Heat pockets are prevented.

Clear advantages are:
- Even air distribution
- Short cooling times
- Uniform product cooling
- No fluctuations in product temperatures
- Quality is retained

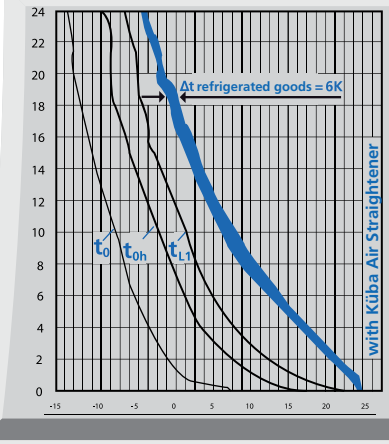
Küba Air Straighteners ➡ short cooling times



Cooling curve comparison
Küba high performance SG Air Coolers



Without Küba Air Straighteners
- Poor room ventilation
- Large differences in product temperatures: 6K
- Relatively long cooling times

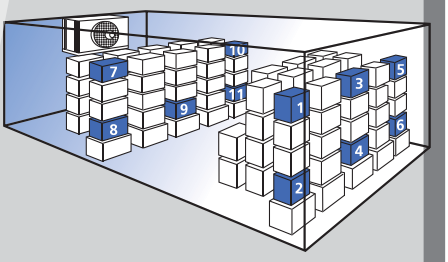


With Küba Air Straighteners
- Better distribution of cooled air
- Products are cooled more evenly: 1K
- Short cooling times
- Lower temperature difference (DT1)
- Lower operational costs

Key:
t_0 = Evaporating temperature at coil outlet
t_{0h} = Superheated temperature at coil outlet
t_{L1} = Air entry temperature into the air cooler

Küba Air Straighteners ➡ More uniform product temperatures

Uniform product temperatures:
Documented by measurement series in cold storage area

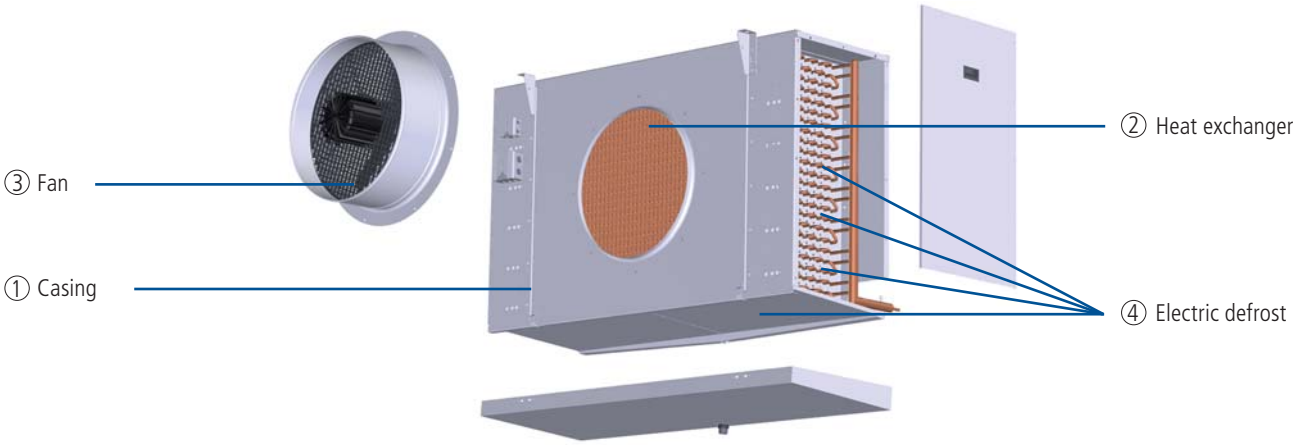


To perform the cooling curve comparison, a cold storage area was filled with stacks of goods. The measuring points 1-11 show the development of the product core temperature in relation to cooling time.

The starting conditions were identical in both trials – inlet temperature 24 °C. For the cooler without an Air straightener, the temperature difference in the stack of goods after 21 hours cooling time was 6K.

The Küba SG with Air straightener achieved the outstanding result of only a 1K temperature difference.

Construction



1. Casing

- Smooth Sendzimir galvanised steel
- High-grade powder coating, papyrus white RAL 9018
  - Food quality
  - Easy to clean
  - Optimum corrosion protection
- Hinge-down drip tray and removable side panels
- Stainless steel mounting material
- Plastic drain up to 1 1/4“, longer than 2“, stainless steel

2. Heat exchanger

- Fin spacing
  SGA.I: 4,5 mm
  SGB.I: 7 mm
  SGK.I: 12 mm
- Tube arrangement aligned, spacing 50 x 50 mm
- HFE® tube / fin system
- **SG *industrial*-F: FKW / CO_2**
  Küba-CAL® refrigerant distributor for multiple injection
  Tubing: Cu-special
  Fins: Al
  End plates: Al
- **SG *industrial*-G: Glycol**
  Distributor tubes for multiple injection
  Tubing: Cu-special
  Fins: Al
  End plates: Al
- **SG *industrial*-N: Pump operation, NH_3**
  Distributor tubes for multiple injection
  Tubing: VA
  Fins: Al
  End plates: Al

3. Fans

- Ø 500 / 560 / 630 / 710 / 800 mm
- With built-in protector to be connected on site
- Application range: -40 °C bis +45 °C
- 400 ± 10% V-3~ 50Hz
- In the standard design the fans are equipped with Air Straighteners, air duct and contact protection.
- Protection class IP 54 in accordance with EN 60529
- Insulation class F in accordance with EN 60034
- Operating data can be found with Küba Select or in the technical data.
- Optional Controller:
  Phase control ☐
  Transformer ☐
  Delta / star ☑
  Frequency converter ☑

⚠ Please observe the manufacturer‘s information.

Motor label data (max. allowable value +40 °C)

	50 Hz		
	min^{-1}	W	A
SG. 50–F41-F85	1400	800	1,40
SG. 56–F41-F85	1350	1400	2,50
SG. 63–F41-F85	880	680	1,60
SG. 71–F41-F84	900	1200	2,30
SG. 80–F41-F84	930	2200	3,50

4. Electric defrost

- 230 ±10% V-1~ or 400 ±10% V-3~ -Y
- Heaters with CrNi steel sleeve
- Vapour-tight connections
- Connector cable 1,5 mm^2 x 1000 mm
- Designed to defrost the fin package quickly and evenly
- To prevent vapour build-up and to accomplish heat exchange with almost no loss, the heaters are mounted in special expanded tube sleeves
- Wired ready for connection to the connection box in accordance with VDE specifications

Refrigerant / coolant

- Can be used with all HFC refrigerants, performance data can be found with Küba Select (Product Selection Software)
- For water / brine circulation choose your air cooler with Küba Select
- For CO_2 operation and for NH_3 applications immediate selection with Küba Select is possible; or ask our technical staff in sales

! The performance data in the Q_V charts refer to the combination of materials: tubes, Cu / fins, Al.

Küba Blue Line
Freshness that lasts longer

Technical data (R404A) SGA-F 4,5 mm

Nomenclature

Standard

SG	A	E	71	-	F	6	2

- Line designation
- Fin spacing: A = 4,5 mm; B = 7 mm; K = 10 mm; L = 12 mm
- Electric defrosting: E = with electric defrost
- Fan diameter: 50 = 500 mm; 56 = 560 mm; 63 = 630 mm; 71 = 710 mm; 80 = 800 mm
- Number of fans: 1-5
- Coil depth: 4 tubes; 6 tubes; 8 tubes
- Refrigerant: F = FKW/CO_2; G = Glycol; N = NH_3

SGA(E)-F

Model SGA(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
50-F41	✇	9,8	7,9	55	5900	23	15	9	10	28	500	1390	657	1,32
50-F61	✇	12,2	9,8	82	5400	23	15	13	10	28	500	1390	657	1,32
56-F41	✇	12,5	10,1	73	7200	28	18	12	10	28	560	1338	813	1,78
56-F61	✇	15,7	12,5	110	6750	28	18	17	15	35	560	1338	813	1,78
56-F81	✇	17,6	14,1	146	6300	28	18	23	15	35	560	1338	813	1,78
63-F41	✇	15,5	12,3	99	8010	33	21	16	15	28	630	919	539	1,38
63-F61	✇	19,2	15,3	148	7650	33	21	23	22	35	630	919	539	1,38
63-F81	✇	21,1	16,7	198	7020	33	21	31	22	35	630	919	539	1,38
71-F41	✇	23,1	18,5	154	11700	43	26	24	15	35	710	940	1140	2,39
71-F61	✇	28,3	22,6	231	11000	43	26	36	22	35	710	940	1140	2,39
71-F81	✇	31,6	25,2	308	10400	43	26	48	22	42	710	940	1140	2,39
80-F41	✇	31,8	25,5	179	18450	48	-	28	15	42	800	940	1630	3,46
80-F61	✇	39,5	31,5	269	17460	48	-	42	22	42	800	940	1630	3,46
80-F81	✇	44,0	35,1	359	16200	48	-	56	22	42	800	940	1630	3,46
50-F42	✇✇	19,6	15,6	110	11800	33	21	17	15	35	500	1390	657	1,32
50-F62	✇✇	24,6	19,6	164	10800	33	21	25	15	35	500	1390	657	1,32
56-F42	✇✇	25,1	20,1	146	14400	39	25	22	15	35	560	1338	813	1,78
56-F62	✇✇	31,6	25,2	220	13500	39	25	34	22	42	560	1338	813	1,78
56-F82	✇✇	35,3	28,2	292	12600	39	25	45	22	42	560	1338	813	1,78
63-F42	✇✇	30,8	24,6	198	16020	45	29	30	22	42	630	919	539	1,38
63-F62	✇✇	38,6	30,8	296	15300	45	29	45	22	42	630	919	539	1,38
63-F82	✇✇	42,1	33,6	396	14040	45	29	60	22	42	630	919	539	1,38
71-F42	✇✇	46,3	37,1	308	23400	58	35	46	22	42	710	940	1140	2,39
71-F62	✇✇	56,8	45,3	462	22000	58	35	70	28	54	710	940	1140	2,39
71-F82	✇✇	63,2	50,5	616	20800	58	35	93	28	54	710	940	1140	2,39
80-F42	✇✇	63,7	51,0	358	36900	63	-	54	22	54	800	940	1630	3,46
80-F62	✇✇	79,0	63,1	538	34920	63	-	82	2x22	2x42	800	940	1630	3,46
80-F82	✇✇	88,0	70,2	718	32400	63	-	108	2x22	2x42	800	940	1630	3,46
50-F43	✇✇✇	29,5	23,5	165	17700	40	26	25	15	42	500	1390	657	1,32
50-F63	✇✇✇	37,0	29,5	246	16200	40	26	37	22	42	500	1390	657	1,32
56-F43	✇✇✇	37,7	30,1	220	21600	49	32	33	15	42	560	1338	813	1,78
56-F63	✇✇✇	47,5	37,8	330	20250	49	32	50	22	42	560	1338	813	1,78

Technical data (R404A) SGA-F 4,5 mm

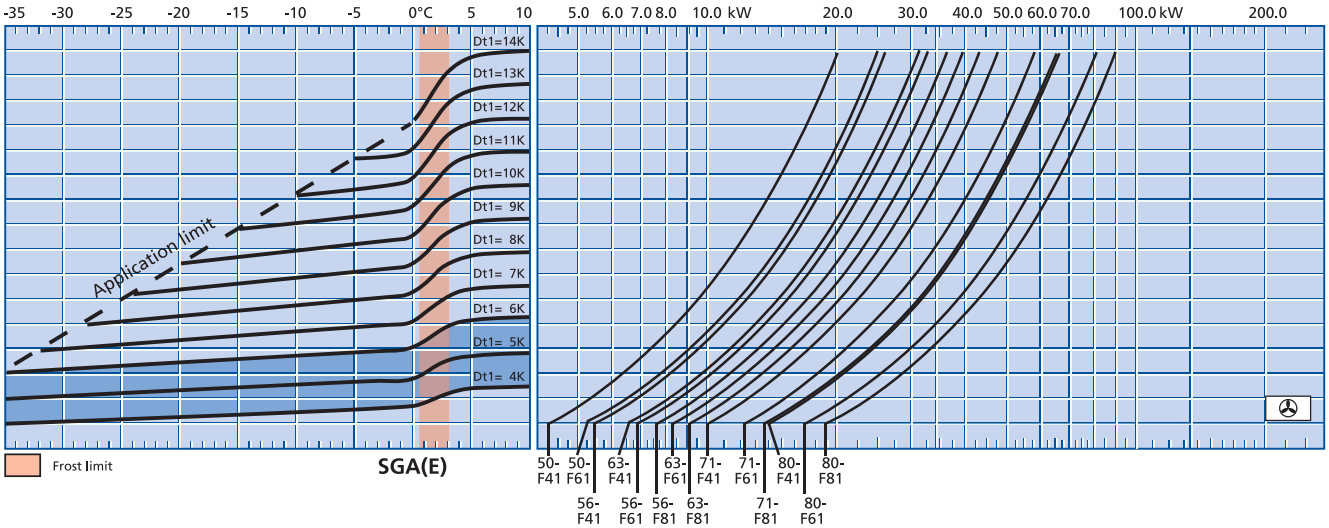
SGA(E)-F

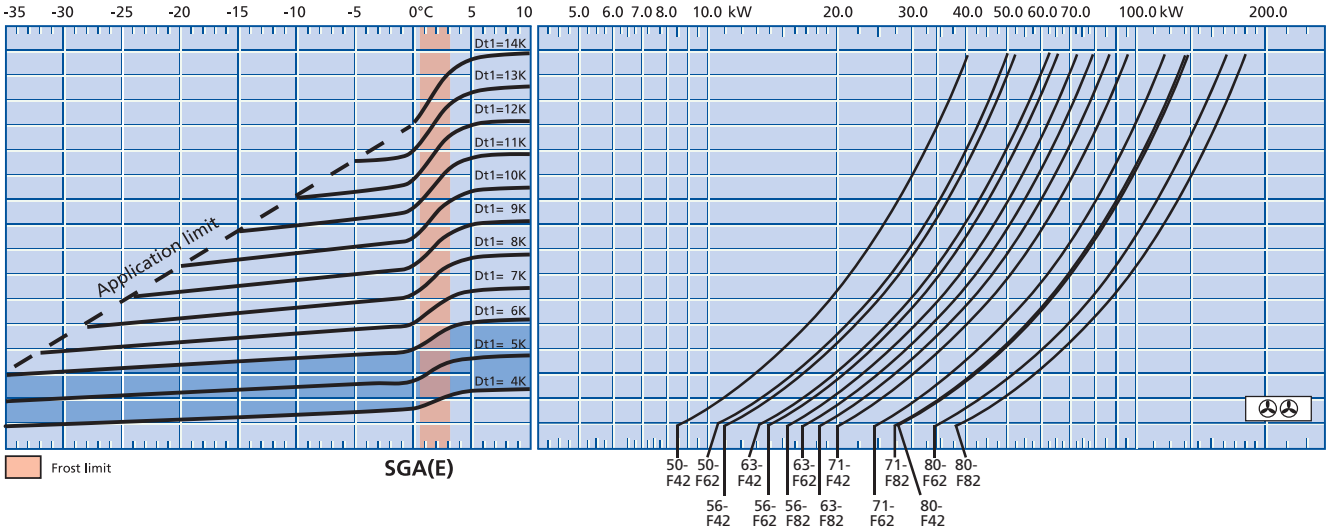
Model SGA(E)		Rating Q_0 at 50 Hz t_{c1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{c1} -18°C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
56-F83	✇✇✇	53,1	42,3	438	18900	49	32	66	22	54	560	1338	813	1,78
63-F43	✇✇✇	46,3	37,1	297	24030	58	38	45	22	42	630	919	539	1,38
63-F63	✇✇✇	58,0	46,2	444	22950	58	38	67	22	54	630	919	539	1,38
63-F83	✇✇✇	63,1	50,5	594	21060	58	38	89	28	54	630	919	539	1,38
71-F43	✇✇✇	69,5	55,5	462	35100	68	41	69	28	54	710	940	1140	2,39
71-F63	✇✇✇	85,2	68,1	693	33000	68	41	104	2x22	2x42	710	940	1140	2,39
71-F83	✇✇✇	95,0	75,8	924	31200	68	41	138	2x28	2x42	710	940	1140	2,39
80-F43	✇✇✇	95,7	76,5	537	55350	72	-	81	28	54	800	940	1630	3,46
80-F63	✇✇✇	118,5	94,6	807	52380	72	-	121	2x28	2x54	800	940	1630	3,46
80-F83	✇✇✇	132,0	105,5	1077	48600	72	-	161	2x28	2x54	800	940	1630	3,46
50-F44	✇✇✇✇	39,3	31,5	220	23600	42	27	33	15	42	500	1390	657	1,32
50-F64	✇✇✇✇	49,3	39,3	328	21600	42	27	50	22	54	500	1390	657	1,32
56-F44	✇✇✇✇	50,3	40,1	293	28800	51	33	44	22	54	560	1338	813	1,78
56-F64	✇✇✇✇	63,2	50,5	440	27000	51	33	66	28	54	560	1338	813	1,78
56-F84	✇✇✇✇	70,7	56,5	584	25200	51	33	88	2x22	2x42	560	1338	813	1,78
63-F44	✇✇✇✇	61,7	49,3	396	32040	60	39	59	22	54	630	919	539	1,38
63-F64	✇✇✇✇	77,2	61,7	592	30600	60	39	89	28	54	630	919	539	1,38
63-F84	✇✇✇✇	84,2	67,2	792	28080	60	39	118	2x22	2x42	630	919	539	1,38
71-F44	✇✇✇✇	92,7	74,1	616	46800	73	44	92	28	54	710	940	1140	2,39
71-F64	✇✇✇✇	113,6	90,7	924	44000	73	44	138	2x22	2x54	710	940	1140	2,39
71-F84	✇✇✇✇	126,6	101,1	1232	41600	73	44	184	2x28	2x54	710	940	1140	2,39
80-F44	✇✇✇✇	127,6	102,0	716	73800	74	-	107	28	64	800	940	1630	3,46
80-F64	✇✇✇✇	158,1	126,2	1076	69840	74	-	161	2x28	2x54	800	940	1630	3,46
80-F84	✇✇✇✇	176,0	140,5	1436	64800	74	-	214	2x28	2x54	800	940	1630	3,46
50-F45	✇✇✇✇✇	49,1	39,2	275	29500	47	31	41	22	54	500	1390	657	1,32
50-F65	✇✇✇✇✇	61,6	49,2	410	27000	47	31	62	22	54	500	1390	657	1,32
56-F45	✇✇✇✇✇	63,0	50,2	366	36000	56	36	55	22	54	560	1338	813	1,78
56-F65	✇✇✇✇✇	79,1	63,1	550	33750	56	36	82	28	54	560	1338	813	1,78
56-F85	✇✇✇✇✇	88,5	70,6	730	31500	56	36	109	2x22	2x42	560	1338	813	1,78
63-F45	✇✇✇✇✇	77,2	61,7	495	40050	66	43	74	22	54	630	919	539	1,38
63-F65	✇✇✇✇✇	96,5	77,1	740	38250	66	43	111	28	54	630	919	539	1,38
63-F85	✇✇✇✇✇	105,3	84,1	990	35100	66	43	147	2x22	2x54	630	919	539	1,38

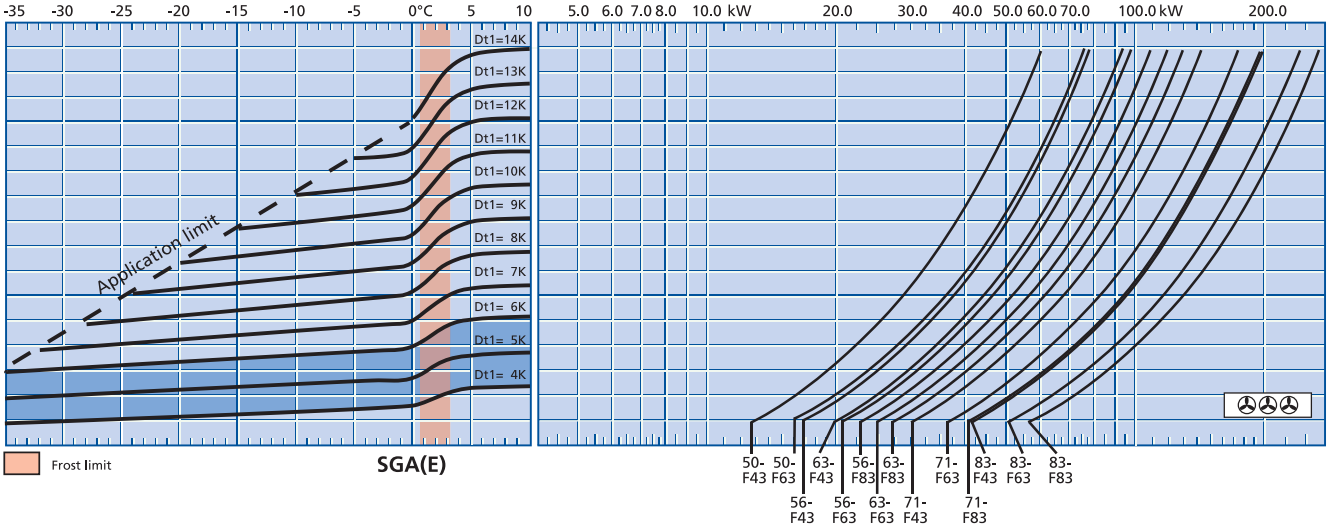
Q_V chart (EN 328, R404A) — SGA-F — 4,5 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity



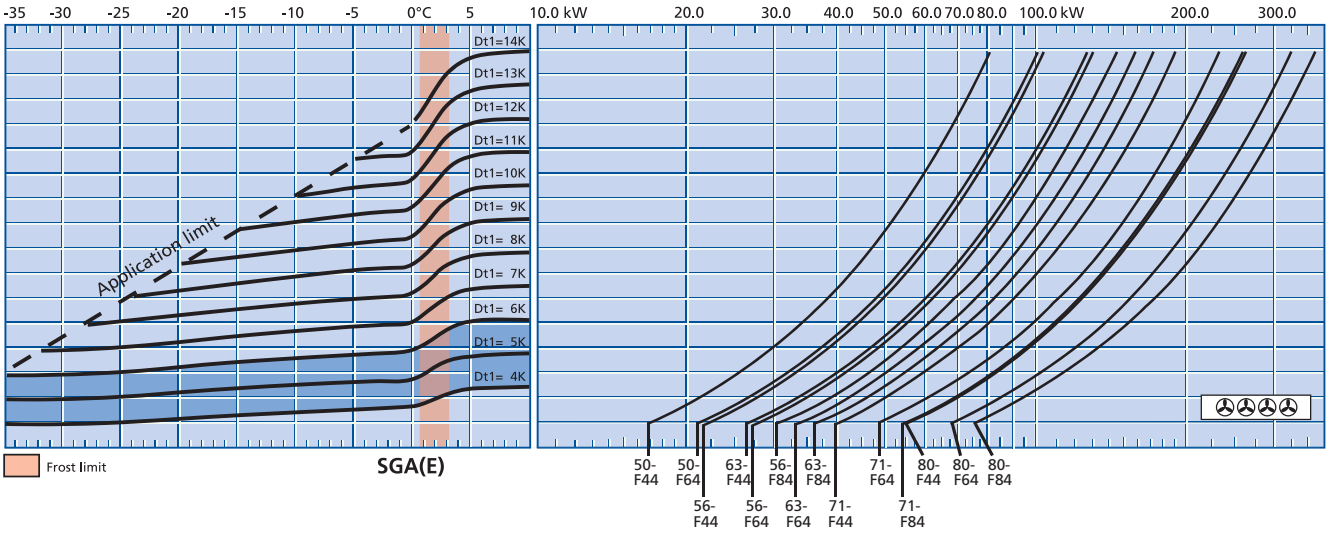


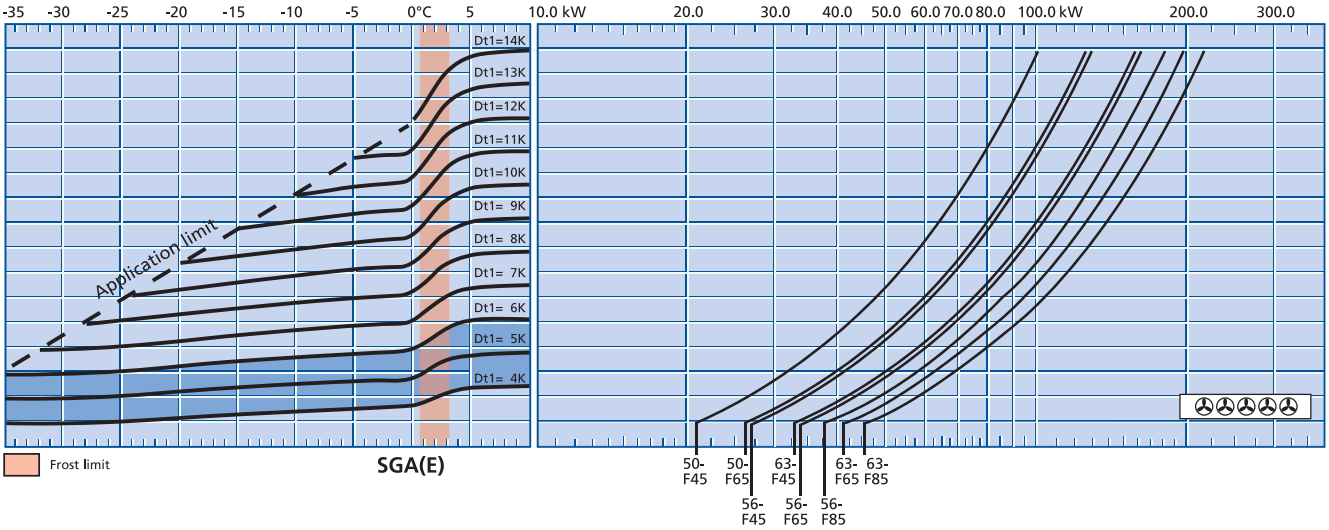


Q_V chart (EN 328, R404A) SGA-F 4,5 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity





Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.

Technical data (R404A) SGB-F 7 mm

SGB(E)-F

Model SGB(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
50-F41	✇	7,9	6,3	36	6300	25	16	9	10	28	500	1390	657	1,32
50-F61	✇	10,6	8,5	54	5900	25	16	13	10	28	500	1390	657	1,32
56-F41	✇	10,5	8,5	48	7900	30	20	12	10	28	560	1338	813	1,78
56-F61	✇	14,1	11,2	72	7500	30	20	17	15	35	560	1338	813	1,78
56-F81	✇	16,5	13,1	97	7300	30	20	23	15	35	560	1338	813	1,78
63-F41	✇	12,6	10,1	65	8600	35	23	16	15	28	630	919	539	1,38
63-F61	✇	16,6	13,2	98	8400	35	23	23	22	35	630	919	539	1,38
63-F81	✇	19,7	15,7	130	8200	35	23	31	22	35	630	919	539	1,38
71-F41	✇	19,1	15,2	101	12300	45	27	24	15	35	710	940	1140	2,39
71-F61	✇	25,1	20,1	152	12000	45	27	36	22	35	710	940	1140	2,39
71-F81	✇	29,2	23,3	203	11600	45	27	48	22	42	710	940	1140	2,39
80-F41	✇	26,3	21,1	118	20250	50	-	28	15	42	800	940	1630	3,46
80-F61	✇	31,6	25,2	177	19350	50	-	42	22	42	800	940	1630	3,46
80-F81	✇	38,6	30,8	236	18450	50	-	56	22	42	800	940	1630	3,46
50-F42	✇✇	15,8	12,6	72	12600	36	23	17	15	35	500	1390	657	1,32
50-F62	✇✇	21,3	17,1	109	11800	36	23	25	15	35	500	1390	657	1,32
56-F42	✇✇	21,1	16,8	96	15800	42	27	22	15	35	560	1338	813	1,78
56-F62	✇✇	28,1	22,5	145	15000	42	27	34	22	42	560	1338	813	1,78
56-F82	✇✇	32,8	26,2	193	14600	42	27	45	22	42	560	1338	813	1,78
63-F42	✇✇	25,3	20,2	130	17200	48	31	30	22	42	630	919	539	1,38
63-F62	✇✇	33,3	26,6	195	16800	48	31	45	22	42	630	919	539	1,38
63-F82	✇✇	39,5	31,6	260	16400	48	31	60	22	42	630	919	539	1,38
71-F42	✇✇	38,3	30,6	202	24600	61	37	46	22	42	710	940	1140	2,39
71-F62	✇✇	50,3	40,1	304	24000	61	37	70	28	54	710	940	1140	2,39
71-F82	✇✇	58,5	46,7	406	23200	61	37	93	28	54	710	940	1140	2,39
80-F42	✇✇	52,8	42,1	236	40500	66	-	54	22	54	800	940	1630	3,46
80-F62	✇✇	63,2	50,5	354	38700	66	-	82	2x22	2x42	800	940	1630	3,46
80-F82	✇✇	77,2	61,7	472	36900	66	-	108	2x22	2x42	800	940	1630	3,46
50-F43	✇✇✇	23,7	19,0	109	18900	44	29	25	15	42	500	1390	657	1,32
50-F63	✇✇✇	32,1	25,6	163	17700	44	29	37	22	42	500	1390	657	1,32
56-F43	✇✇✇	31,7	25,3	145	23700	53	34	33	15	42	560	1338	813	1,78
56-F63	✇✇✇	42,2	33,7	217	22500	53	34	50	22	42	560	1338	813	1,78

Technical data (R404A) SGB-F 7 mm

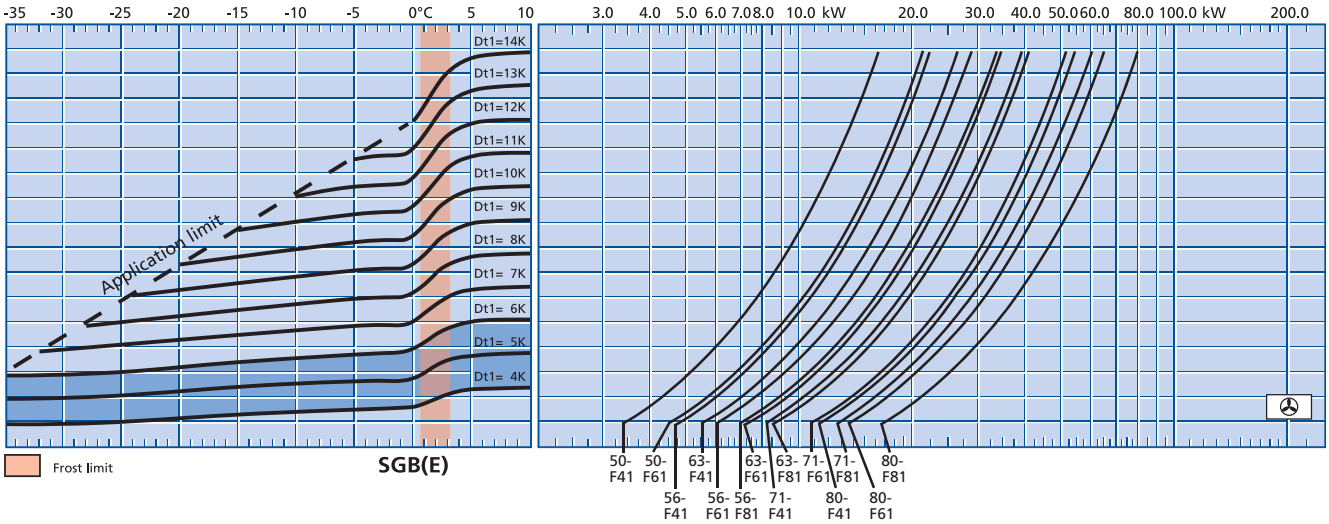
SGB(E)-F

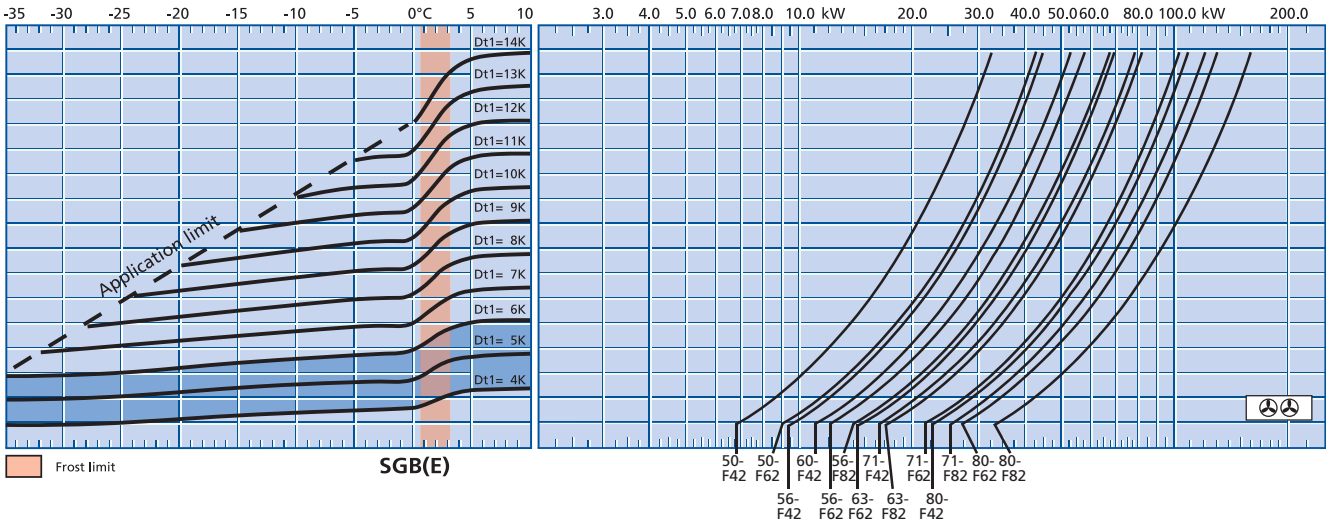
Model SGB(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18°C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
56-F83	✇✇✇	49,3	39,3	290	21900	53	34	66	22	54	560	1338	813	1,78
63-F43	✇✇✇	38,1	30,5	195	25800	62	40	45	22	42	630	919	539	1,38
63-F63	✇✇✇	50,1	40,0	293	25200	62	40	67	22	54	630	919	539	1,38
63-F83	✇✇✇	59,5	47,5	390	24600	62	40	89	28	54	630	919	539	1,38
71-F43	✇✇✇	57,5	46,0	303	36900	72	43	69	28	54	710	940	1140	2,39
71-F63	✇✇✇	75,5	60,3	456	36000	72	43	104	2x22	2x42	710	940	1140	2,39
71-F83	✇✇✇	87,8	70,1	609	34800	72	43	138	2x28	2x42	710	940	1140	2,39
80-F43	✇✇✇	79,2	63,2	354	60750	76	-	81	28	54	800	940	1630	3,46
80-F63	✇✇✇	95,0	75,8	531	58050	76	-	121	2x28	2x54	800	940	1630	3,46
80-F83	✇✇✇	116,0	92,5	708	55350	76	-	161	2x28	2x54	800	940	1630	3,46
50-F44	✇✇✇✇	31,6	25,2	145	25200	46	30	33	15	42	500	1390	657	1,32
50-F64	✇✇✇✇	42,8	34,2	217	23600	46	30	50	22	54	500	1390	657	1,32
56-F44	✇✇✇✇	42,3	33,8	193	31600	55	36	44	22	54	560	1338	813	1,78
56-F64	✇✇✇✇	56,3	45,0	289	30000	55	36	66	28	54	560	1338	813	1,78
56-F84	✇✇✇✇	65,7	52,5	386	29200	55	36	88	2x22	2x42	560	1338	813	1,78
63-F44	✇✇✇✇	50,8	40,5	260	34400	64	42	59	22	54	630	919	539	1,38
63-F64	✇✇✇✇	66,7	53,3	391	33600	64	42	89	28	54	630	919	539	1,38
63-F84	✇✇✇✇	79,2	63,2	520	32800	64	42	118	2x22	2x42	630	919	539	1,38
71-F44	✇✇✇✇	76,7	61,3	404	49200	77	46	92	28	54	710	940	1140	2,39
71-F64	✇✇✇✇	100,6	80,5	608	48000	77	46	138	2x28	2x54	710	940	1140	2,39
71-F84	✇✇✇✇	117,1	93,5	812	46400	77	46	184	2x28	2x54	710	940	1140	2,39
80-F44	✇✇✇✇	105,6	84,5	472	81000	78	-	107	28	64	800	940	1630	3,46
80-F64	✇✇✇✇	126,6	101,1	708	77400	78	-	161	2x28	2x54	800	940	1630	3,46
80-F84	✇✇✇✇	154,5	123,5	944	73800	78	-	214	2x28	2x54	800	940	1630	3,46
50-F45	✇✇✇✇✇	39,5	31,6	181	31500	51	33	41	22	54	500	1390	657	1,32
50-F65	✇✇✇✇✇	53,5	42,7	272	29500	51	33	62	22	54	500	1390	657	1,32
56-F45	✇✇✇✇✇	53,0	42,2	241	39500	60	39	55	22	54	560	1338	813	1,78
56-F65	✇✇✇✇✇	70,3	56,2	362	37500	60	39	82	28	54	560	1338	813	1,78
56-F85	✇✇✇✇✇	82,2	65,6	483	36500	60	39	109	2x22	2x42	560	1338	813	1,78
63-F45	✇✇✇✇✇	63,5	50,7	326	43000	70	46	74	22	54	630	919	539	1,38
63-F65	✇✇✇✇✇	83,5	66,6	489	42000	70	46	111	28	54	630	919	539	1,38
63-F85	✇✇✇✇✇	99,1	79,1	650	41000	70	46	147	2x22	2x54	630	919	539	1,38

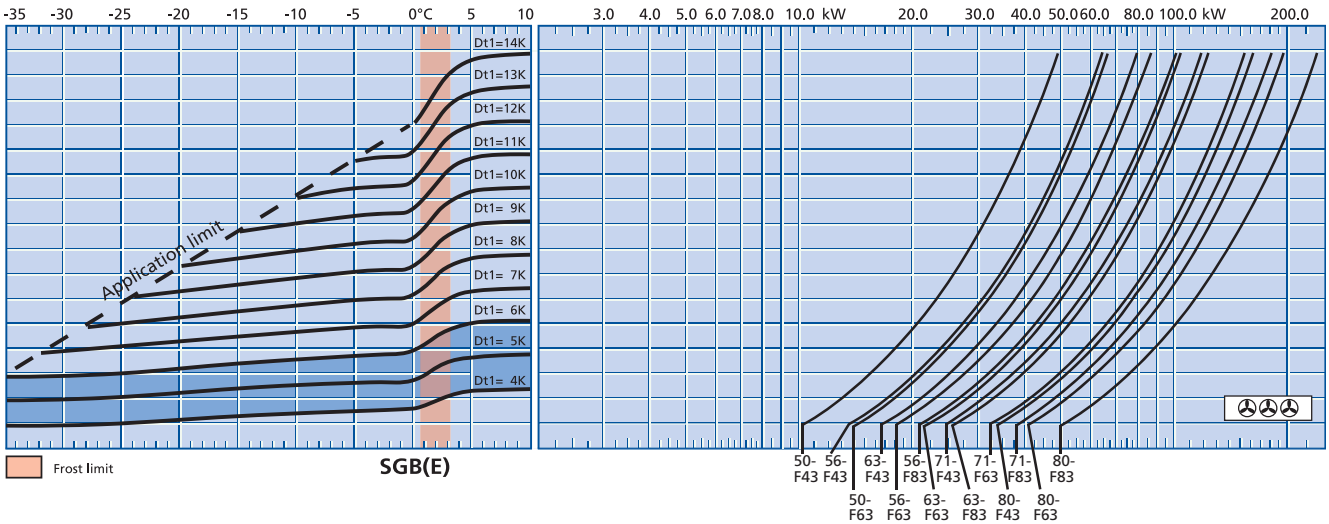
Q_V chart (EN 328, R404A) — SGB-F — 7 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity



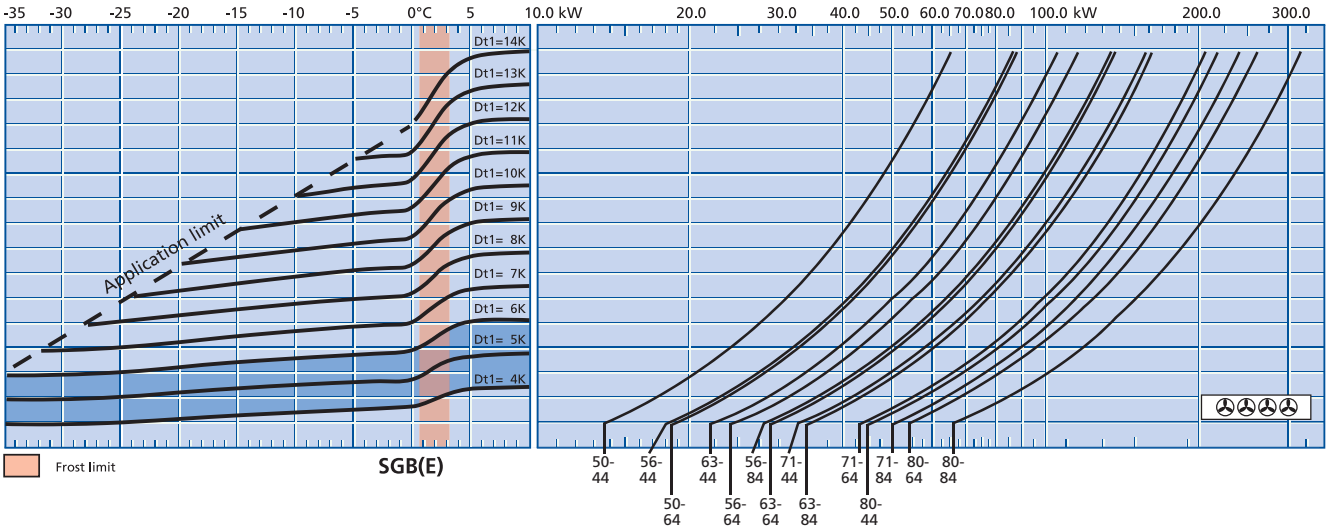


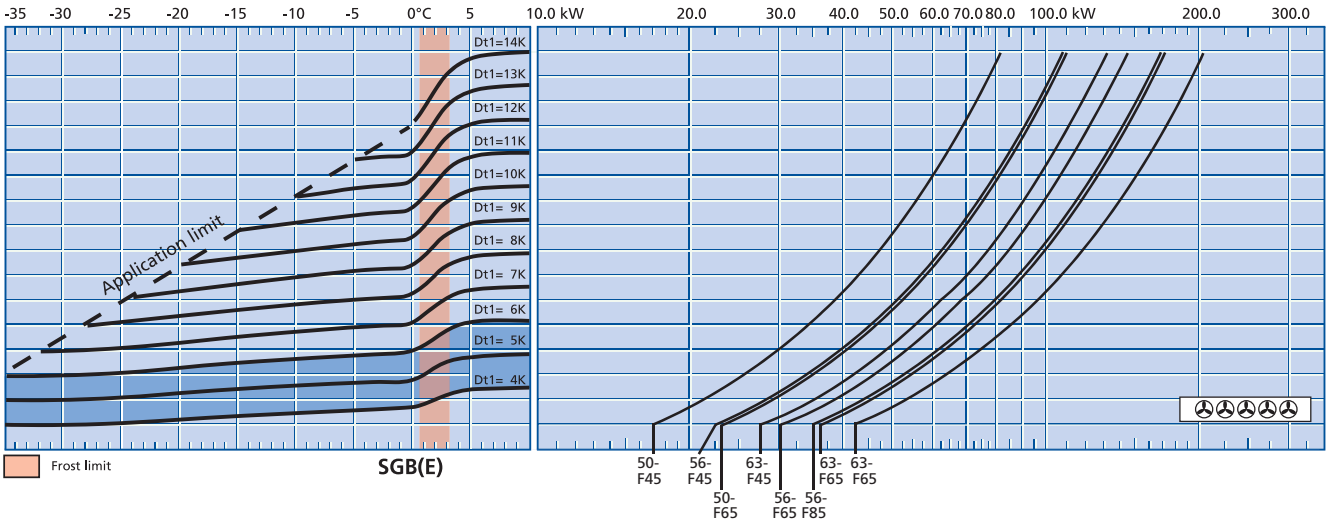


Q_V chart (EN 328, R404A) SGB-F 7 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity





Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.

Technical data (R404A) SGK-F 10 mm

SGK(E)-F

Model SGK(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
50-F41	✇	6,6	5,3	26	6500	26	17	9	10	28	500	1390	657	1,32
50-F61	✇	9,3	7,5	39	6300	26	17	13	10	28	500	1390	657	1,32
56-F41	✇	8,6	7,0	35	8000	31	20	12	10	28	560	1338	813	1,78
56-F61	✇	11,7	9,5	52	7600	31	20	17	15	35	560	1338	813	1,78
56-F81	✇	14,1	11,3	69	7400	31	20	23	15	35	560	1338	813	1,78
63-F41	✇	11,0	8,7	47	9100	36	23	16	15	28	630	919	539	1,38
63-F61	✇	14,5	11,5	70	8800	36	23	23	22	35	630	919	539	1,38
63-F81	✇	17,2	13,7	94	8500	36	23	31	22	35	630	919	539	1,38
71-F41	✇	15,6	12,5	73	12800	46	28	24	15	35	710	940	1140	2,39
71-F61	✇	21,6	17,2	109	12400	46	28	36	22	35	710	940	1140	2,39
71-F81	✇	26,1	20,7	146	12150	46	28	48	22	42	710	940	1140	2,39
80-F41	✇	22,3	17,8	85	21150	51	-	28	15	42	800	940	1630	3,46
80-F61	✇	27,8	22,2	128	20520	51	-	42	22	42	800	940	1630	3,46
80-F81	✇	34,6	27,6	170	19800	51	-	56	22	42	800	940	1630	3,46
50-F42	✇✇	13,1	10,5	52	13000	37	24	17	15	35	500	1390	657	1,32
50-F62	✇✇	18,6	14,8	78	12600	37	24	25	15	35	500	1390	657	1,32
56-F42	✇✇	17,5	13,8	69	16000	43	28	22	15	35	560	1338	813	1,78
56-F62	✇✇	23,6	18,8	104	15200	43	28	34	22	42	560	1338	813	1,78
56-F82	✇✇	28,3	22,6	139	14800	43	28	45	22	42	560	1338	813	1,78
63-F42	✇✇	21,8	17,5	94	18200	49	32	30	22	42	630	919	539	1,38
63-F62	✇✇	28,8	23,1	141	17600	49	32	45	22	42	630	919	539	1,38
63-F82	✇✇	34,6	27,6	187	17000	49	32	60	22	42	630	919	539	1,38
71-F42	✇✇	31,3	25,1	146	25600	62	37	46	22	42	710	940	1140	2,39
71-F62	✇✇	43,3	34,6	218	24800	62	37	70	28	54	710	940	1140	2,39
71-F82	✇✇	52,1	41,5	292	24300	62	37	93	28	54	710	940	1140	2,39
80-F42	✇✇	44,8	35,8	170	42300	67	-	54	22	54	800	940	1630	3,46
80-F62	✇✇	55,8	44,5	256	41040	67	-	82	2x22	2x42	800	940	1630	3,46
80-F82	✇✇	69,2	55,3	340	39600	67	-	108	2x22	2x42	800	940	1630	3,46
50-F43	✇✇✇	19,7	15,7	78	19500	45	29	25	15	42	500	1390	657	1,32
50-F63	✇✇✇	28,1	22,3	117	18900	45	29	37	22	42	500	1390	657	1,32
56-F43	✇✇✇	26,1	20,8	104	24000	54	35	33	15	42	560	1338	813	1,78
56-F63	✇✇✇	35,5	28,3	156	22800	54	35	50	22	42	560	1338	813	1,78

Technical data (R404A) SGK-F 10 mm

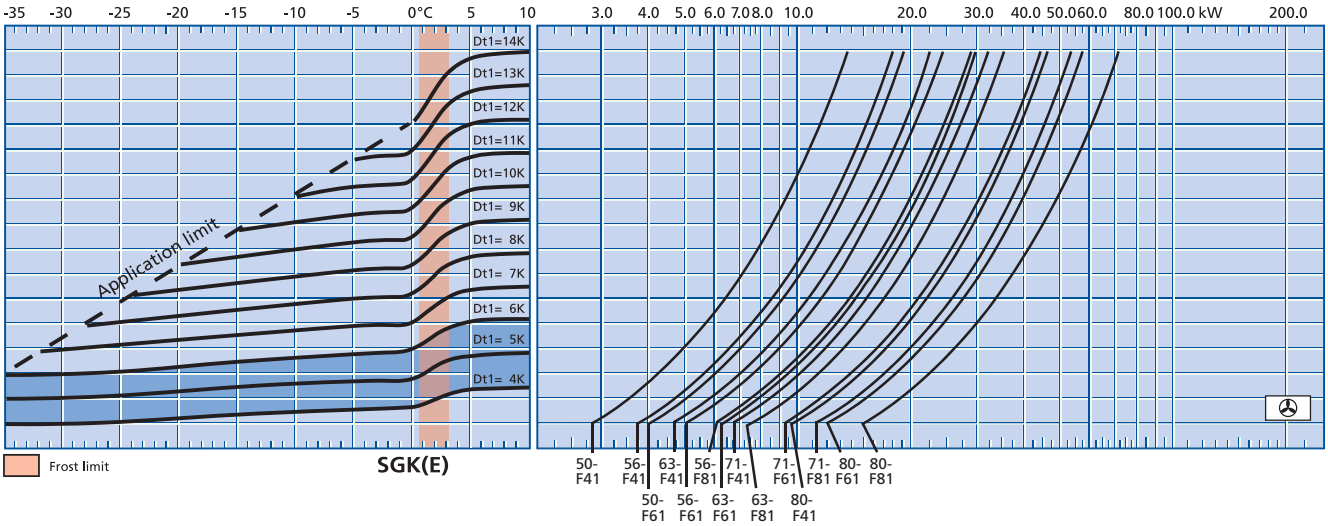
SGK(E)-F

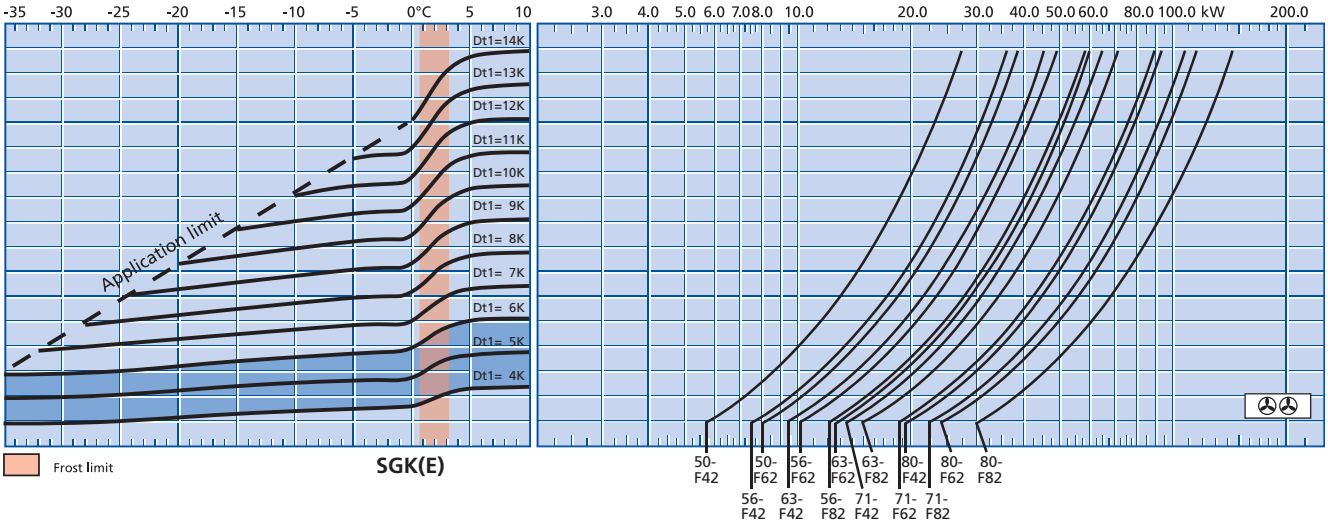
Model SGK(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18°C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
56-F83	✇✇✇	42,5	34,1	208	22200	54	35	66	22	54	560	1338	813	1,78
63-F43	✇✇✇	32,8	26,2	141	27300	63	41	45	22	42	630	919	539	1,38
63-F63	✇✇✇	43,3	34,6	211	26400	63	41	67	22	54	630	919	539	1,38
63-F83	✇✇✇	52,0	41,5	281	25500	63	41	89	28	54	630	919	539	1,38
71-F43	✇✇✇	47,1	37,6	219	38400	73	44	69	28	54	710	940	1140	2,39
71-F63	✇✇✇	65,1	52,0	327	37200	73	44	104	2x22	2x42	710	940	1140	2,39
71-F83	✇✇✇	78,1	62,5	438	36450	73	44	138	2x28	2x42	710	940	1140	2,39
80-F43	✇✇✇	67,2	53,7	255	63450	77	-	81	28	54	800	940	1630	3,46
80-F63	✇✇✇	83,7	66,8	384	61560	77	-	121	2x28	2x54	800	940	1630	3,46
80-F83	✇✇✇	104,0	83,1	510	59400	77	-	161	2x28	2x54	800	940	1630	3,46
50-F44	✇✇✇✇	26,3	21,1	104	26000	47	31	33	15	42	500	1390	657	1,32
50-F64	✇✇✇✇	37,3	29,8	156	25200	47	31	50	22	54	500	1390	657	1,32
56-F44	✇✇✇✇	34,8	27,8	139	32000	56	36	44	22	54	560	1338	813	1,78
56-F64	✇✇✇✇	47,3	37,7	208	30400	56	36	66	28	54	560	1338	813	1,78
56-F84	✇✇✇✇	56,8	45,3	278	29600	56	36	88	2x22	2x42	560	1338	813	1,78
63-F44	✇✇✇✇	43,8	35,1	188	36400	65	42	59	22	54	630	919	539	1,38
63-F64	✇✇✇✇	57,8	46,1	281	35200	65	42	89	28	54	630	919	539	1,38
63-F84	✇✇✇✇	69,2	55,3	375	34000	65	42	118	2x22	2x42	630	919	539	1,38
71-F44	✇✇✇✇	62,7	50,1	292	51200	78	47	92	28	54	710	940	1140	2,39
71-F64	✇✇✇✇	86,7	69,2	436	49600	78	47	138	2x22	2x54	710	940	1140	2,39
71-F84	✇✇✇✇	104,1	83,2	584	48600	78	47	184	2x28	2x54	710	940	1140	2,39
80-F44	✇✇✇✇	89,7	71,6	340	84600	79	-	107	28	64	800	940	1630	3,46
80-F64	✇✇✇✇	111,6	89,1	512	82080	79	-	161	2x28	2x54	800	940	1630	3,46
80-F84	✇✇✇✇	138,5	110,7	680	79200	79	-	214	2x28	2x54	800	940	1630	3,46
50-F45	✇✇✇✇✇	33,0	26,3	130	32500	52	34	41	22	54	500	1390	657	1,32
50-F65	✇✇✇✇✇	46,7	37,3	196	31500	52	34	62	22	54	500	1390	657	1,32
56-F45	✇✇✇✇✇	43,5	34,8	174	40000	61	40	55	22	54	560	1338	813	1,78
56-F65	✇✇✇✇✇	59,1	47,2	261	38000	61	40	82	28	54	560	1338	813	1,78
56-F85	✇✇✇✇✇	71,1	56,7	347	37000	61	40	109	2x22	2x42	560	1338	813	1,78
63-F45	✇✇✇✇✇	54,8	43,7	235	45500	71	46	74	22	54	630	919	539	1,38
63-F65	✇✇✇✇✇	72,2	57,7	352	44000	71	46	111	28	54	630	919	539	1,38
63-F85	✇✇✇✇✇	86,6	69,1	469	42500	71	46	147	2x22	2x54	630	919	539	1,38

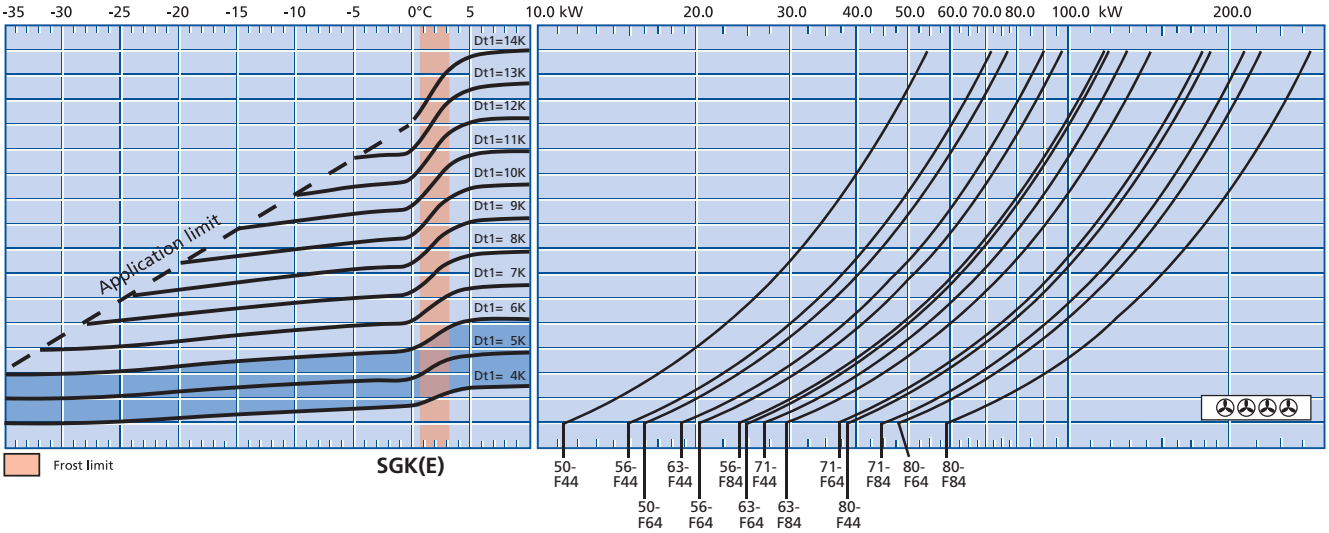
Q_V chart (EN 328, R404A) — SGK-F — 10 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity



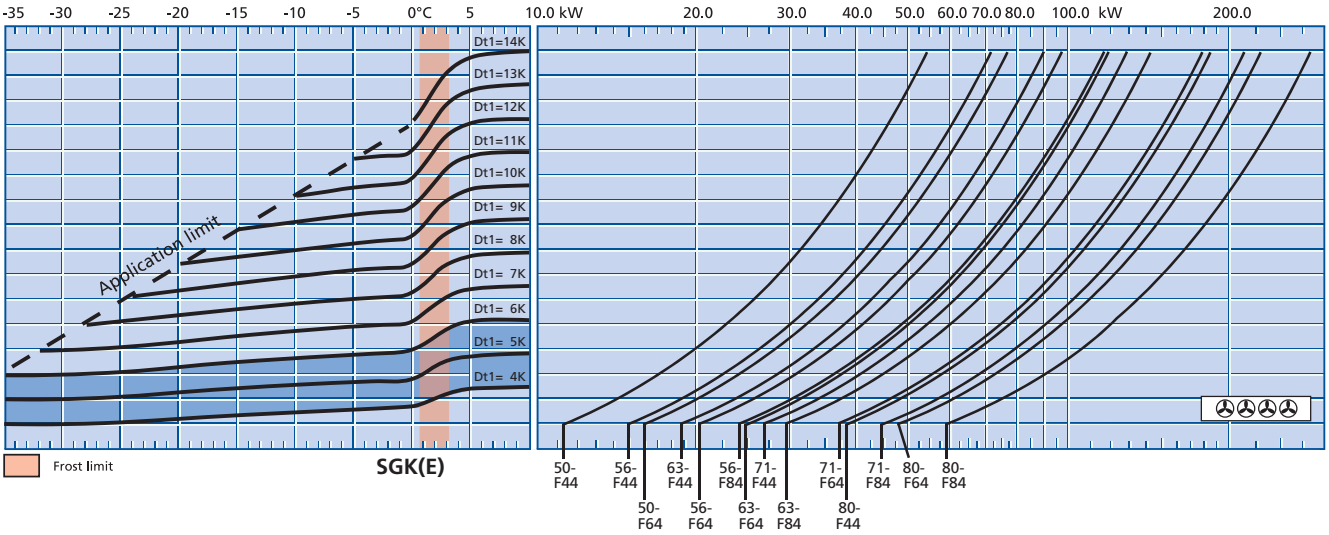


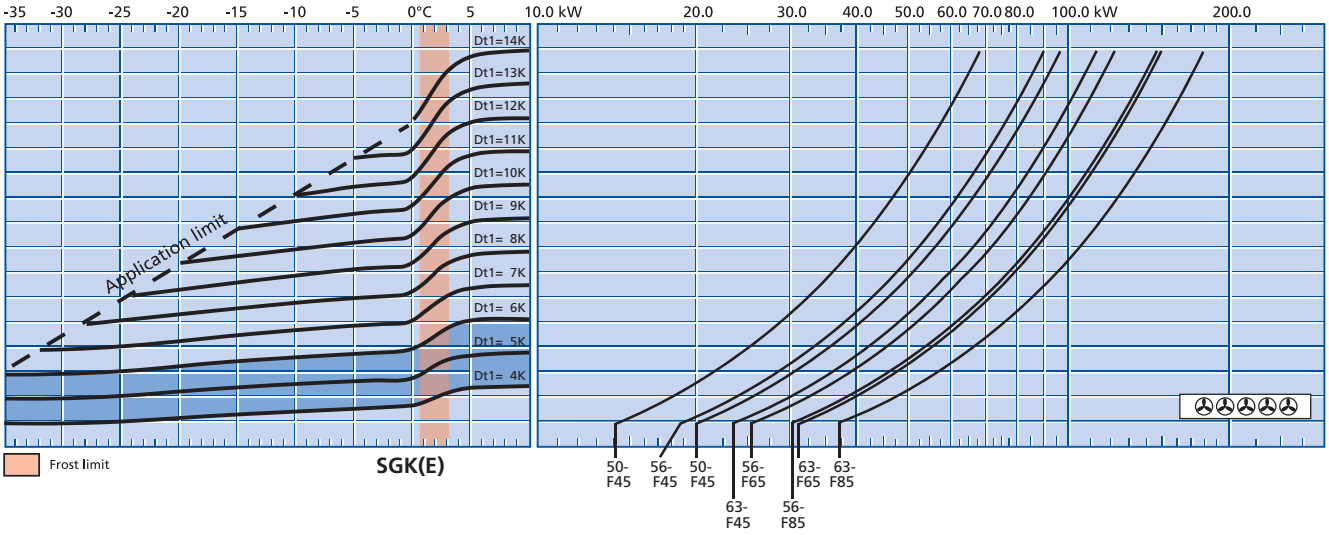


Q_V chart (EN 328, R404A) SGK-F 10 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity





Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.

Technical data (R404A) SGL-F 12 mm

SGL(E)-F

Model SGL(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18 °C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
50-F41	✇	6,2	4,9	22	6700	27	18	9	10	28	500	1390	657	1,32
50-F61	✇	8,5	6,8	33	6500	27	18	13	10	28	500	1390	657	1,32
56-F41	✇	7,9	6,3	30	8100	32	21	12	10	28	560	1338	813	1,78
56-F61	✇	11,0	8,8	44	7900	32	21	17	15	35	560	1338	813	1,78
56-F81	✇	13,3	10,7	59	7700	32	21	23	15	35	560	1338	813	1,78
63-F41	✇	9,7	7,8	40	9200	37	24	16	15	28	630	919	539	1,38
63-F61	✇	13,5	10,8	60	9000	37	24	23	22	35	630	919	539	1,38
63-F81	✇	16,0	12,7	80	8700	37	24	31	22	35	630	919	539	1,38
71-F41	✇	14,2	11,4	62	12800	47	28	24	15	35	710	940	1140	2,39
71-F61	✇	19,9	15,9	93	12600	47	28	36	22	35	710	940	1140	2,39
71-F81	✇	24,2	19,3	124	12400	47	28	48	22	42	710	940	1140	2,39
80-F41	✇	20,2	16,1	72	21600	52	-	28	15	42	800	940	1630	3,46
80-F61	✇	24,8	19,8	108	20880	52	-	42	22	42	800	940	1630	3,46
80-F81	✇	31,9	25,5	144	20520	52	-	56	22	42	800	940	1630	3,46
50-F42	✇✇	12,4	9,9	44	13400	37	24	17	15	35	500	1390	657	1,32
50-F62	✇✇	17,0	13,5	66	13000	37	24	25	15	35	500	1390	657	1,32
56-F42	✇✇	15,7	12,6	59	16200	43	28	22	15	35	560	1338	813	1,78
56-F62	✇✇	21,9	17,5	88	15800	43	28	34	22	42	560	1338	813	1,78
56-F82	✇✇	26,7	21,3	118	15400	43	28	45	22	42	560	1338	813	1,78
63-F42	✇✇	19,5	15,5	80	18400	49	32	30	22	42	630	919	539	1,38
63-F62	✇✇	26,9	21,5	119	18000	49	32	45	22	42	630	919	539	1,38
63-F82	✇✇	31,9	25,5	159	17400	49	32	60	22	42	630	919	539	1,38
71-F42	✇✇	28,4	22,7	124	25600	62	37	46	22	42	710	940	1140	2,39
71-F62	✇✇	39,9	31,9	186	25200	62	37	70	28	54	710	940	1140	2,39
71-F82	✇✇	48,4	38,6	248	24800	62	37	93	28	54	710	940	1140	2,39
80-F42	✇✇	40,4	32,3	144	43200	67	-	54	22	54	800	940	1630	3,46
80-F62	✇✇	49,6	39,6	216	41760	67	-	82	2x22	2x42	800	940	1630	3,46
80-F82	✇✇	63,8	51,0	288	41040	67	-	108	2x22	2x42	800	940	1630	3,46
50-F43	✇✇✇	18,6	14,8	66	20100	45	29	25	15	42	500	1390	657	1,32
50-F63	✇✇✇	25,4	20,3	99	19500	45	29	37	22	42	500	1390	657	1,32
56-F43	✇✇✇	23,6	18,8	89	24300	54	35	33	15	42	560	1338	813	1,78
56-F63	✇✇✇	32,9	26,3	133	23700	54	35	50	22	42	560	1338	813	1,78

Technical data (R404A) SGL-F 12 mm

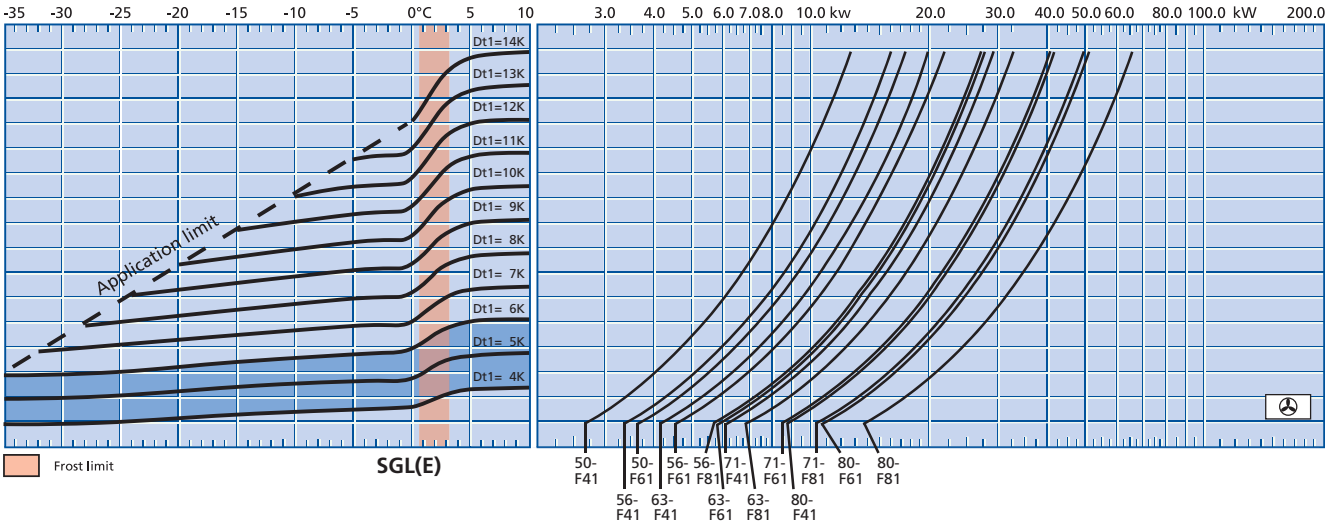
SGL(E)-F

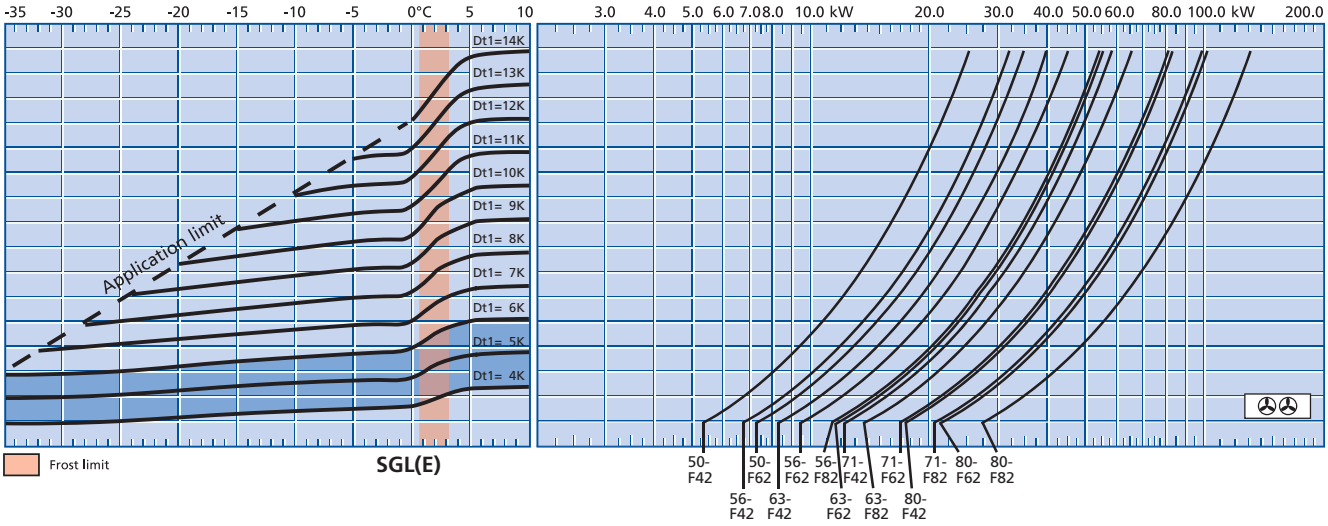
Model SGL(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{L1} -18°C DT1 = 7K	Surface	Air flow	Air throw		Tube volume	Connections Inlet	Connections Outlet	Blade	Per Fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
56-F83	✇✇✇	40,0	32,0	177	23100	54	35	66	22	54	560	1338	813	1,78
63-F43	✇✇✇	29,2	23,3	119	27600	63	41	45	22	42	630	919	539	1,38
63-F63	✇✇✇	40,4	32,3	179	27000	63	41	67	22	54	630	919	539	1,38
63-F83	✇✇✇	47,9	38,2	239	26100	63	41	89	28	54	630	919	539	1,38
71-F43	✇✇✇	42,6	34,1	186	38400	73	44	69	28	54	710	940	1140	2,39
71-F63	✇✇✇	59,8	47,8	278	37800	73	44	104	2x22	2x42	710	940	1140	2,39
71-F83	✇✇✇	72,6	58,0	372	37200	73	44	138	2x28	2x42	710	940	1140	2,39
80-F43	✇✇✇	60,6	48,4	217	64800	77	-	81	28	54	800	940	1630	3,46
80-F63	✇✇✇	74,4	59,5	324	62640	77	-	121	2x28	2x54	800	940	1630	3,46
80-F83	✇✇✇	95,8	76,5	432	61560	77	-	161	2x28	2x54	800	940	1630	3,46
50-F44	✇✇✇✇	24,7	19,8	88	26800	47	31	33	15	42	500	1390	657	1,32
50-F64	✇✇✇✇	33,9	27,1	132	26000	47	31	50	22	54	500	1390	657	1,32
56-F44	✇✇✇✇	31,4	25,1	118	32400	56	36	44	22	54	560	1338	813	1,78
56-F64	✇✇✇✇	43,9	35,1	177	31600	56	36	66	28	54	560	1338	813	1,78
56-F84	✇✇✇✇	53,4	42,6	236	30800	56	36	88	2x22	2x42	560	1338	813	1,78
63-F44	✇✇✇✇	38,9	31,1	159	36800	65	42	59	22	54	630	919	539	1,38
63-F64	✇✇✇✇	53,9	43,0	239	36000	65	42	89	28	54	630	919	539	1,38
63-F84	✇✇✇✇	63,8	51,0	318	34800	65	42	118	2x22	2x42	630	919	539	1,38
71-F44	✇✇✇✇	56,9	45,4	248	51200	78	47	92	28	54	710	940	1140	2,39
71-F64	✇✇✇✇	79,8	63,7	371	50400	78	47	138	2x28	2x54	710	940	1140	2,39
71-F84	✇✇✇✇	96,8	77,3	496	49600	78	47	184	2x28	2x54	710	940	1140	2,39
80-F44	✇✇✇✇	80,8	64,5	289	86400	79	-	107	28	64	800	940	1630	3,46
80-F64	✇✇✇✇	99,2	79,3	432	83520	79	-	161	2x28	2x54	800	940	1630	3,46
80-F84	✇✇✇✇	127,7	102,0	576	82080	79	-	214	2x28	2x54	800	940	1630	3,46
50-F45	✇✇✇✇✇	30,9	24,7	110	33500	52	34	41	22	54	500	1390	657	1,32
50-F65	✇✇✇✇✇	42,4	33,9	165	32500	52	34	62	22	54	500	1390	657	1,32
56-F45	✇✇✇✇✇	39,3	31,4	148	40500	61	40	55	22	54	560	1338	813	1,78
56-F65	✇✇✇✇✇	54,9	43,8	221	39500	61	40	82	28	54	560	1338	813	1,78
56-F85	✇✇✇✇✇	66,7	53,3	295	38500	61	40	109	2x22	2x42	560	1338	813	1,78
63-F45	✇✇✇✇✇	48,6	38,8	199	46000	71	46	74	22	54	630	919	539	1,38
63-F65	✇✇✇✇✇	67,3	53,8	299	45000	71	46	111	28	54	630	919	539	1,38
63-F85	✇✇✇✇✇	79,8	63,7	398	43500	71	46	147	2x22	2x54	630	919	539	1,38

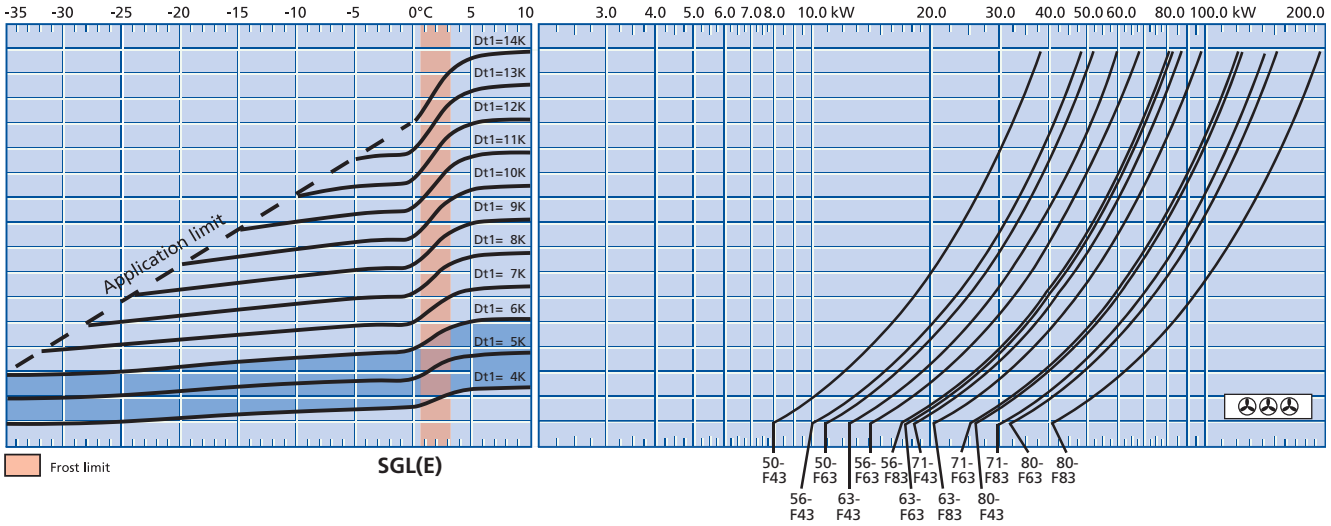
Q_V chart (EN328, R404A) — SGL-F — 12 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity



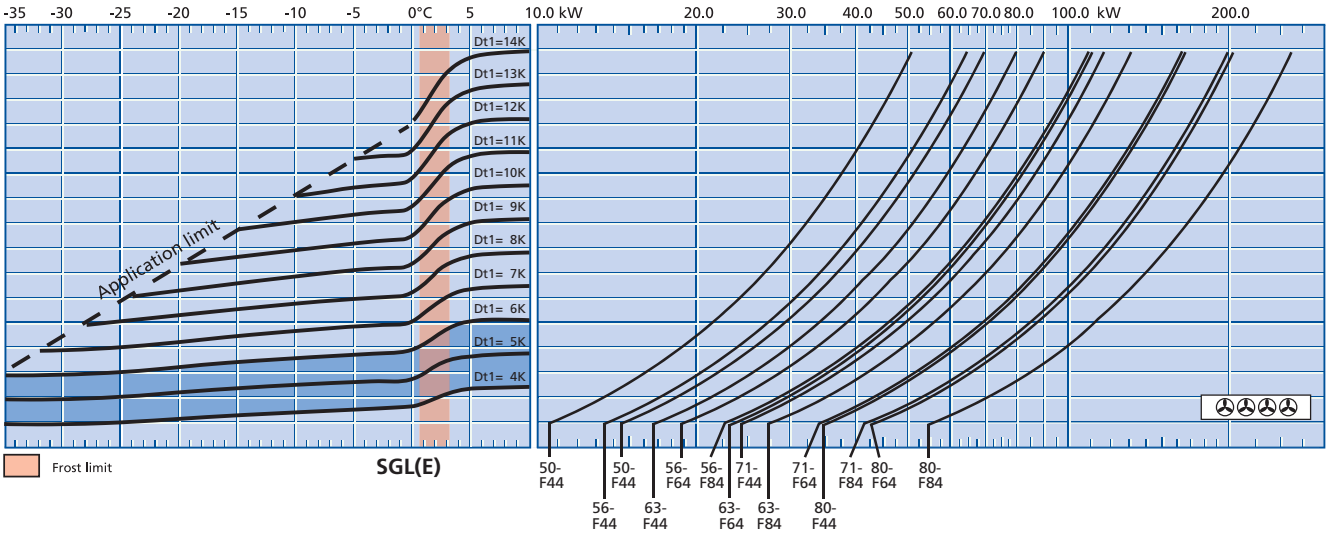


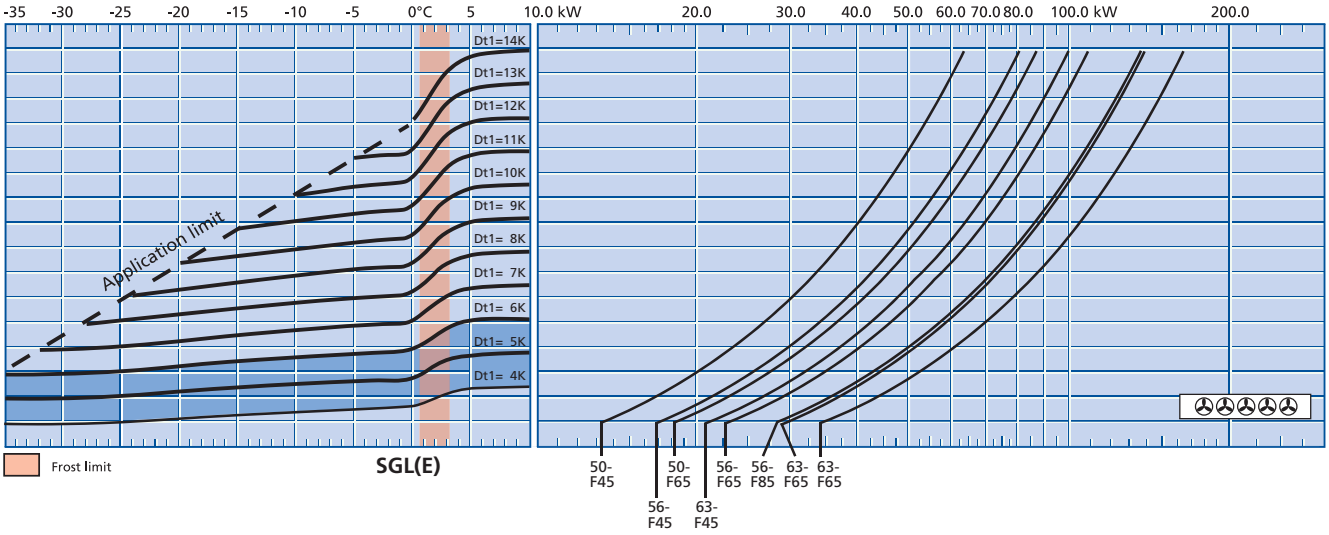


Q_v chart (EN328, R404A) — SGL-F — 12 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity



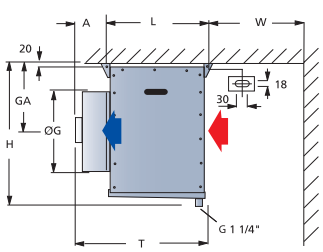


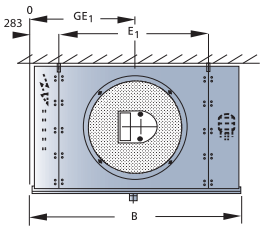
Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

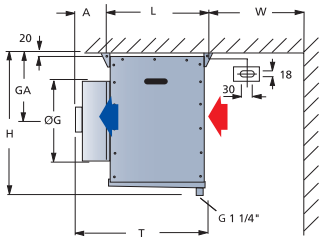
DT1 = 4 K bis 6 K
with electronic expansion valve

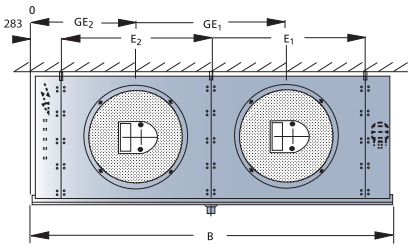
Example selection:
For example and explanation, see the information section on p. 136.

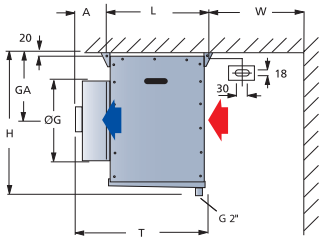
Dimensional drawings

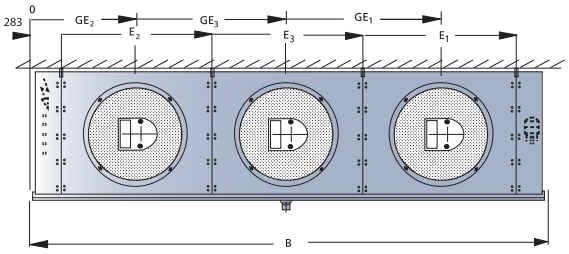


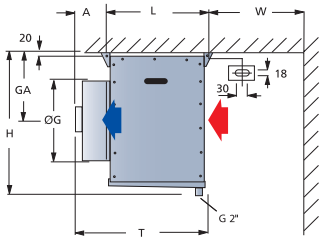


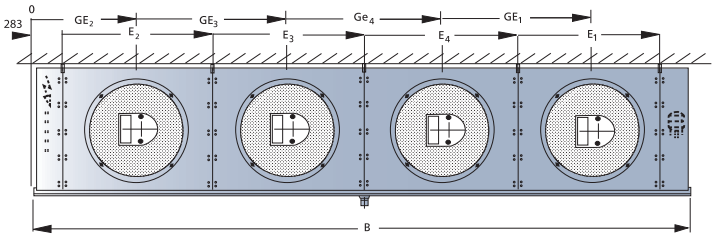


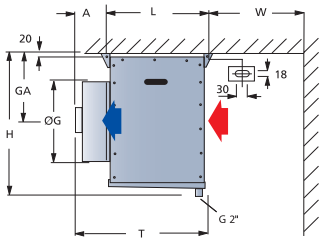


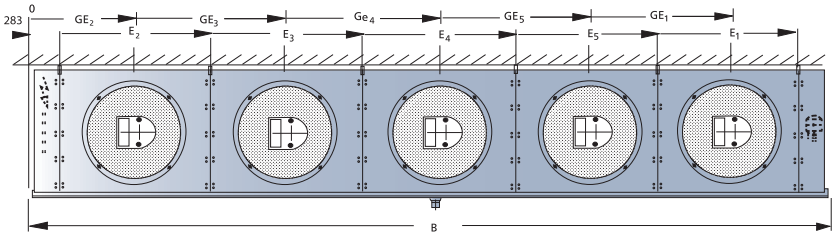












* Note the differences in dimension for accessories!
The dimensions are only valid for standard model design! When installing fans other than those listed in the „Technical data“, dimensions T and A are larger.

Sound power level L_{WA} [dB(A)]

Model	✇	✇ ✇	✇ ✇ ✇	✇ ✇ ✇ ✇	✇ ✇ ✇ ✇ ✇
SG 50	78	81	83	84	85
SG 56	85	88	90	91	92
SG 63	75	78	80	81	82
SG 70	87	90	92	93	–
SG 80	85	88	90	91	–

Dimensional drawings, electric defrost, weights

	Dimensions [mm]																			Electrical defrost			Net weight			
Size	H	B	T	L	E_1	E_2	E_3	E_4	E_5	A	W	W_{Hood}	ØG	GA	GE_1	GE_2	GE_3	GE_4	GE_5	Coil	Tray	Total	SGA	SGB	SGK	SGL
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kW	kW	kW / *	kg	kg	kg	kg
50-41	718	1620	918	704	1054	-	-	-	-	232	500	860	517	329	783	-	-	-	-	4,78	2,29	7,07/1	130	122	119	117
50-61	718	1620	918	704	1054	-	-	-	-	232	500	860	517	329	783	-	-	-	-	5,97	2,29	8,26/1	146	139	130	127
56-41	918	1620	917	704	1054	-	-	-	-	231	550	860	563	429	783	-	-	-	-	6,69	2,29	8,98/1	163	152	149	146
56-61	918	1620	917	704	1054	-	-	-	-	231	550	860	563	429	783	-	-	-	-	7,96	2,29	10,25/2	185	164	165	163
56-81	918	1620	917	704	1054	-	-	-	-	231	550	860	563	429	783	-	-	-	-	10,51	2,29	12,8/2	214	192	184	180
63-41	1018	1820	942	729	1254	-	-	-	-	231	600	960	636	479	883	-	-	-	-	9,16	2,60	11,76/2	205	192	186	182
63-61	1018	1820	942	729	1254	-	-	-	-	231	600	960	636	479	883	-	-	-	-	10,31	2,60	12,91/2	236	215	208	203
63-81	1018	1820	942	729	1254	-	-	-	-	231	600	960	636	479	883	-	-	-	-	13,74	2,60	16,34/2	269	241	232	225
71-41	1318	2020	1082	757	1454	-	-	-	-	343	700	1340	733	629	983	-	-	-	-	14,30	2,87	17,17/2	286	264	257	251
71-61	1318	2020	1082	757	1454	-	-	-	-	343	700	1340	733	629	983	-	-	-	-	15,60	2,87	18,47/2	334	301	290	281
71-81	1318	2020	1082	757	1454	-	-	-	-	343	700	1340	733	629	983	-	-	-	-	22,10	2,87	24,97/2	387	343	328	317
80-41	1518	2020	1173	757	1454	-	-	-	-	434	800	1340	803	729	983	-	-	-	-	16,90	2,87	19,77/2	352	309	301	295
80-61	1518	2020	1173	757	1454	-	-	-	-	434	800	1340	803	729	983	-	-	-	-	18,20	2,87	21,07/2	401	353	341	331
80-81	1518	2020	1173	757	1454	-	-	-	-	434	800	1340	803	729	983	-	-	-	-	26,00	2,87	28,87/2	452	400	384	370
50-42	718	2620	918	704	2054	1000	-	-	-	232	500	860	517	329	1783	783	-	-	-	8,60	3,75	12,35/2	214	199	193	189
50-62	718	2620	918	704	2054	1000	-	-	-	232	500	860	517	329	1783	783	-	-	-	10,80	3,75	14,55/2	247	223	216	210
56-42	918	2620	917	704	2054	1000	-	-	-	231	550	860	563	429	1783	783	-	-	-	12,04	3,75	15,79/2	268	247	241	235
56-62	918	2620	917	704	2054	1000	-	-	-	231	550	860	563	429	1783	783	-	-	-	14,40	3,75	18,15/2	313	282	271	268
56-82	918	2620	917	704	2054	1000	-	-	-	231	550	860	563	429	1783	783	-	-	-	18,92	3,75	22,67/2	363	321	307	296
63-42	1018	3020	942	729	2454	1200	-	-	-	231	600	960	636	479	2083	883	-	-	-	16,00	4,33	20,33/2	347	319	310	302
63-62	1018	3020	942	729	2454	1200	-	-	-	231	600	960	636	479	2083	883	-	-	-	18,00	4,33	22,33/2	410	367	353	342
63-82	1018	3020	942	729	2454	1200	-	-	-	231	600	960	636	479	2083	883	-	-	-	24,00	4,33	28,33/2	473	416	398	384
71-42	1318	3420	1082	757	2854	1400	-	-	-	343	700	1340	733	629	2383	983	-	-	-	24,75	4,84	29,59/2	486	441	427	416
71-62	1318	3420	1082	757	2854	1400	-	-	-	343	700	1340	733	629	2383	983	-	-	-	27,00	4,84	31,84/2	584	516	494	478
71-82	1318	3420	1082	757	2854	1400	-	-	-	343	700	1340	733	629	2383	983	-	-	-	38,25	4,84	43,09/3	680	592	562	540
80-42	1518	3420	1173	757	2854	1400	-	-	-	434	800	1340	803	729	2383	983	-	-	-	29,25	4,84	34,09/2	610	523	508	495
80-62	1518	3420	1173	757	2854	1400	-	-	-	434	800	1340	803	729	2383	983	-	-	-	31,50	4,84	36,34/2	687	608	584	565
80-82	1518	3420	1173	757	2854	1400	-	-	-	434	800	1340	803	729	2383	983	-	-	-	45,00	4,84	49,84/3	802	696	664	638
50-43	718	3620	918	704	3054	1000	2000	-	-	232	500	860	517	329	2783	783	1783	-	-	13,00	5,20	18,2/2	302	278	270	264
50-63	718	3620	918	704	3054	1000	2000	-	-	232	500	860	517	329	2783	783	1783	-	-	15,60	5,20	20,8/2	353	317	306	297
56-43	918	3620	917	704	3054	1000	2000	-	-	231	550	860	563	429	2783	783	1783	-	-	18,20	5,20	23,4/2	377	345	335	327
56-63	918	3620	917	704	3054	1000	2000	-	-	231	550	860	563	429	2783	783	1783	-	-	20,80	5,20	26/2	446	399	383	379
56-83	918	3620	917	704	3054	1000	2000	-	-	231	550	860	563	429	2783	783	1783	-	-	28,60	5,20	33,8/3	519	454	433	417
63-43	1018	4220	942	729	3654	1200	2400	-	-	231	600	960	636	479	3283	883	2083	-	-	23,84	5,96	29,8/2	490	447	490	422
63-63	1018	4220	942	729	3654	1200	2400	-	-	231	600	960	636	479	3283	883	2083	-	-	26,82	5,96	32,78/2	583	517	583	481
63-83	1018	4220	942	729	3654	1200	2400	-	-	231	600	960	636	479	3283	883	2083	-	-	35,76	5,96	41,72/3	679	594	680	544
71-43	1318	4820	1082	757	4254	1400	2800	-	-	343	700	1340	733	629	3783	983	2383	-	-	37,84	6,88	44,27/3	704	637	701	599
71-63	1318	4820	1082	757	4254	1400	2800	-	-	343	700	1340	733	629	3783	983	2383	-	-	41,28	6,88	47,64/3	847	746	710	688
71-83	1318	4820	1082	757	4254	1400	2800	-	-	343	700	1340	733	629	3783	983	2383	-	-	58,48	6,88	64,49/4	999	866	997	790
80-43	1518	4820	1173	757	4254	1400	2800	-	-	434	800	1340	803	729	3783	983	2383	-	-	44,72	6,88	51,01/3	886	755	732	712
80-63	1518	4820	1173	757	4254	1400	2800	-	-	434	800	1340	803	729	3783	983	2383	-	-	48,16	6,88	54,38/3	999	880	844	815
80-83	1518	4820	1173	757	4254	1400	2800	-	-	434	800	1340	803	729	3783	983	2383	-	-	68,80	6,88	74,6/4	1179	1021	973	933
50-44	718	4620	918	704	4054	1000	2000	3000	-	232	500	860	517	329	3783	783	1783	2783	-	16,85	6,74	22,64/2	375	343	333	325
50-64	718	4620	918	704	4054	1000	2000	3000	-	232	500	860	517	329	3783	783	1783	2783	-	20,22	6,74	25,82/2	441	393	378	366
56-44	918	4620	917	704	4054	1000	2000	3000	-	231	550	860	563	429	3783	783	1783	2783	-	23,59	6,74	29/2	470	428	414	404
56-64	918	4620	917	704	4054	1000	2000	3000	-	231	550	860	563	429	3783	783	1783	2783	-	26,96	6,74	32,18/2	560	497	476	470
56-84	918	4620	917	704	4054	1000	2000	3000	-	231	550	860	563	429	3783	783	1783	2783	-	37,07	6,74	41,72/3	648	564	536	515
63-44	1018	5420	942	729	4854	1200	2400	3600	-	231	600	960	636	479	4483	883	2083	3283	-	31,20	7,80	39/3	633	576	558	543
63-64	1018	5420	942	729	4854	1200	2400	3600	-	231	600	960	636	479	4483	883	2083	3283	-	35,10	7,80	42,9/3	755	670	642	621
63-84	1018	5420	942	729	4854	1200	2400	3600	-	231	600	960	636	479	4483	883	2083	3283	-	46,80	7,80	54,6/4	883	768	731	703
71-44	1318	6220	1082	757	5654	1400	2800	4200	-	343	700	1340	733	629	5183	983	2383	3783	-	47,92	8,71	57,2/3	895	806	777	755
71-64	1318	6220	1082	757	5654	1400	2800	4200	-	343	700	1340	733	629	5183	983	2383	3783	-	52,27	8,71	61,6/4	1084	949	905	872
71-84	1318	6220	1082	757	5654	1400	2800	4200	-	343	700	1340	733	629	5183	983	2383	3783	-	74,05	8,71	83,6/4	1280	1101	1043	999
80-44	1518	6220	1173	757	5654	1400	2800	4200	-	434	800	1340	803	729	5183	983	2383	3783	-	56,63	8,71	66/4	1132	958	926	900
80-64	1518	6220	1173	757	5654	1400	2800	4200	-	434	800	1340	803	729	5183	983	2383	3783	-	60,98	8,71	70,4/4	1279	1201	1073	1034
80-84	1518	6220	1173	757	5654	1400	2800	4200	-	434	800	1340	803	729	5183	983	2383	3783	-	87,12	8,71	96,8/5	1512	1300	1235	1184
50-45	718	5620	918	704	5054	1000	2000	3000	4000	232	500	860	517	329	4783	783	1783	2783	3783	20,00	8,00	27,3/2	474	434	422	412
50-65	718	5620	918	704	5054	1000	2000	3000	4000	232	500	860	517	329	4783	783	1783	2783	3783	24,00	8,00	31,2/2	559	501	481	466
56-45	918	5620	917	704	5054	1000	2000	3000	4000	231	550	860	563	429	4783	783	1783	2783	3783	28,00	8,00	35,1/2	594	541	524	511
56-65	918	5620	917	704	5054	1000	2000	3000	4000	231	550	860	563	429	4783	783	1783	2783	3783	32,00	8,00	39/3	708	629	603	595
56-85	918	5620	917	704	5054	1000	2000	3000	4000	231	550	860	563	429	4783	783	1783	2783	3783	44,00	8,00	50,7/3	827	722	686	660
63-45	1018	6620	942	729	6054	1200	2400	3600	4800	231	600	960	636	479	5683	883	2083	3283	4483	36,80	9,20	46/3	774	703	679	662
63-65	1018	6620	942	729	6054	1200	2400	3600	4800	231	600	960	636	479	5683	883	2083	3283	4483	41,40	9,20	50,6/3	926	819	784	758
63-85	1018	6620	942	729	6054	1200	2400	3600	4800	231	600	960	636	479	5683	883	2083	3283	4483	55,20	9,20	64,4/4	1085	942	895	860

The dimensions are only valid for standard model design!
Note the differences in dimension for versions and accessories.

* Electric defrost divided in /n circuits

Versions

Motor versions

Normal refrigeration fan guard
- **V1.07**

For certain applications, e.g. in small spaces and quick cooling rooms the fan guard version is the right solution.

In this version, the design of the fan unit includes a contact safety grille without Air Straightener and air duct.

For other alternative motor versions, see Küba Select or version overview, p. 126

Water / brine circulation

- **V2...**

Tube circuitry and connections for water and brine are available.

Alternative casing versions

Double insulated, hinge-down drip tray
- **V3.09**

The double-shelled drip tray has 25 mm of insulation. The insulation prevents condensation water from building up on the bottom side of the tray and reduces the transfer of defrosting heat into the cold storage area.

This changes the following dimensions:

Width B: +60 mm
Height H: +30 mm
Depth T: +30 mm

Hinged fans
- **V3.10**

To make the coolers easy to clean, the fans are mounted with stainless steel hinges.

Defrost versions

All Küba Air Coolers are available with electric defrosting. See nomenclature, p. 72

Hot gas defrost in the drip tray
- Hot gas connection on both sides
- V4.01 Copper
- V4.02 Stainless steel

Hot gas in the heat exchanger
- V6.05 Hot gas connection on the heat exchanger

Hot gas in the heat exchanger and in the drip tray, copper design with/without check valve
- Hot gas connection on both sides
- V6.07 with check valve
- V6.08 without check valve

On request: additional defrosting circuit: for defrost with hot gas in separate circuit for the hot gas; the circuit is integrated into the heat exchanger.

Versions

Protection against corrosion

Stainless steel casing
- **V3.12**

For protection in aggressive cold storage air, e.g. in smokehouses and curing areas, all casing components are stainless steel. Industrial quality.

- **V6.01**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al, protective coating

Casing: Sendzimir galvanised steel, protective coating on both sides

- **V6.02**

Heat exchanger:
Tubing: Stainless steel
Fins: Al „goldlack“ coating
End plates: Stainless steel

Casing: Sendzimir galvanised steel, protective coating on both sides
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **V6.03**

Heat exchanger:
Tubing: Stainless steel
Fins: Al
End plates: Al, protective coating

Casing: Sendzimir galvanised steel, protective coating on one side
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **V6.04**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al

Casing: Sendzimir galvanised steel, protective coating on one side

Further information regarding corrosion protection can be found on pages 132 to 135

Accessories

Recommended for frozen storage

- Shut-Up®
- Defrosting hood
- Fan collar heaters
- Duct at 5° incline
- Double insulated drip tray
- Insulate the top panel on site

Shut-Up®

The Küba Shut-Up® optimises the defrosting procedure, particularly in deep-freeze applications.

Applications
- Frozen storage starting at -18 °C
- Alternating defrosting of the Air Coolers in one room

Advantages (in connection with the defrosting hood)
With Shut-Up® and the defrost hood, a positive accumulation of heat occurs in the air cooler during the defrost process. The heat remains in the cooler, which means:
- Defrosting times reduced more than 50%
- Significant amounts of energy saved
- No frost build up on the ceiling of the storage room or on the goods due to minimal vapour build-up
- Defrosting temperature in cooler is ≦5°C

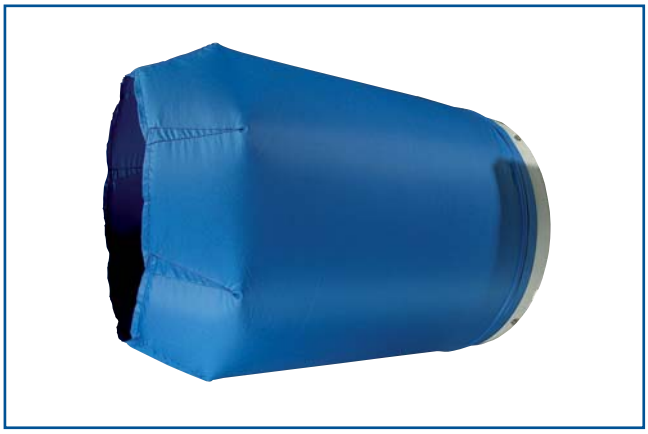
Calculation hint
Due to the additional external pressure, the air quantity and air cooler capacity change:

Model	Change in air quantity	Change in rating
Küba SG *industrial*	-10%	-5%

Selection table

for model	Shut-Up®
SG... ✇	1 piece
SG... ✇ ✇	2 pieces
SG... ✇ ✇ ✇	3 pieces
SG... ✇ ✇ ✇ ✇	4 pieces
SG... ✇ ✇ ✇ ✇ ✇	5 pieces

Note:
Shut-Up®s length =
Ø Flange for textile sock connection x 1,2



Cooling phase, fans switched on: Shut-Up® is inflated

Defrosting, fans switched off: Shut-Up® closes the air cooler

Accessories

Defrost hood

The defrost hood optimises the defrosting process, particularly in deep-freeze applications.

Applications
- Frozen storage starting at -18 °C
- Alternating defrosting of the Air Coolers in one room

Advantages (in connection with Shut-Up®)
With the defrost hood and Shut-Up®, a positive accumulation of heat occurs in the air cooler during the defrost process. The heat remains in the cooler, which means:
- Defrost times reduced by more than 50%
- Significant amounts of energy saved
- No frost build up on the ceiling of the storage room or on the goods due to minimal vapour build-up
- Defrost temperature in cooler is ≦5°C

Construction
- The double-shelled drip tray has 12mm of insulation
- The casing is made of aluminium and is coating (RAL 9018)
- The construction is modular, i.e. 1 module per fan
- Unassembled upon delivery, i.e. the hoods must be mounted on the air cooler on site

Module dimensions and weight:

Model	H mm	B mm	T mm	Weight kg	$W_{min.}$ mm
SG 50..1-5	880	945	800	33	1050
SG 56..1-5	1080	945	800	35	1050
SG 63..1-5	1180	1145	900	42	1150
SG 71..1-4	1580	1345	1280	58	1500
SG 80..1-4	1680	1345	1280	66	1500

Calculation hint
Due to the additional external pressure, the air quantity and air cooler capacity change:

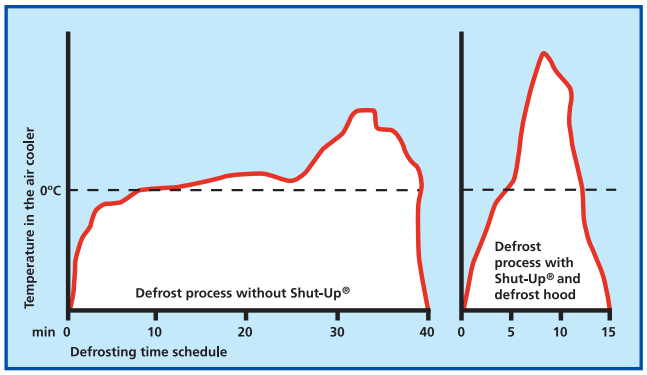
Model	Change in air quantity	Change in cooler rating
SG *industrial*	-10%	-5%

For deep-freeze applications, Küba engineers recommend an insulated drip tray.

When using floor brackets please make sure you have the right version „For defrost hood“.

Mode of operation during defrosting
Shut-Up® is suspended over the fan unit, closing the air cooler. Hot air cannot escape. The cold air from the room forms a blocking layer at the defrosting hood from the outside
- Hot air cannot escape
- A chimney effect is prevented

Defrosting process with Shut-Up® and defrost hood



With our deep-freeze package (Shut-Up® and defrosting hood) you will reduce defrosting time by more than half

Fan collar heater VRB

To prevent the fan blade at the collar from freezing up in cases of extreme humidity in the freezer or frozen storage area.

The standard Küba SG *industrial* line is suitable for use with fan collar heaters. We recommend using fan collar heaters for applications below 0 °C for version V1 .60 to prevent temperatures from falling below the dew point.

Accessories

Scope of delivery

Electric tubular heater with stainless steel sleeve
Ø 8.5 mm
Connection ends: 1.5 x 2000 mm
Tension spring: stainless steel

Technical data

Model	For blade Ø mm	P at 230V kW	Weight kg
VRB 50	500	0,27	0,55
VRB 56	560	0,30	0,60
VRB 63	630	0,39	0,65
VRB 71	710	0,38	0,70
VRB 80	800	0,40	0,80

Selection table

for model	VRB
SG... ✇	1
SG... ✇ ✇	2
SG... ✇ ✇ ✇	3
SG... ✇ ✇ ✇ ✇	4
SG... ✇ ✇ ✇ ✇ ✇	5

Fan collar heater cover

Benefits:

- Contact protection
- Reduces heat radiation from the fan collar heaters into the Cold Room
- Improves heat conductivity at the collar
- Increases the efficiency of the fan collar heaters
- Protects against slipping

Can only be used in connection with a metal air duct.

Duct at 5° incline

For complex deep-freeze applications, the duct has a 5° incline to ensure trouble-free operation.

Applications

- Deep-freeze applications at high humidity
- Deep-freeze applications with high-availability, sensitive products (e.g. pharmaceuticals) with few redundant coolers

Advantages

Ventilation duct at 5° incline ensures that condensation water runs out of the duct into the drip tray.

- Reduced risk of fan blades at the collar freezing up
- Prevents ice formation on the Air Straighteners

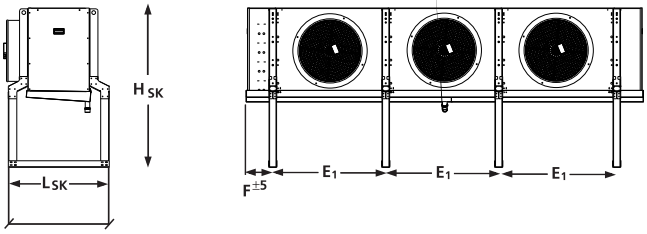
Construction

- Ventilation duct with an inclination of 5° to the casing and integrated air guiding grid
- Ventilation duct made of Sendzimir galvanised steel plate, coated (RAL 9018)
- Suitable for installation of the Küba Shut-Up® – with no additional accessories

Calculation hint

The ducts at 5° incline should always be used together with Shut-Up® and defrosting hoods, fan collar heaters and insulated drip trays.

Floor mounting brackets SK



Küba SG		50	56	63	71	80
Dimensions mm	SK	1048	1048	1073	1101	1101
	H_{SK}	1384	1584	1684	1984	2184
	L_{SK}	782	782	807	835	835
	E_{SK}	=E¹	According Küba SG dimension page 89			
	F	=F				

Accessories

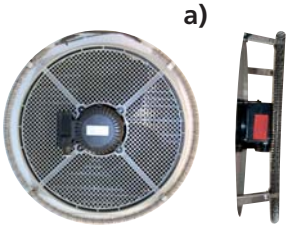
Finned tube heaters SGHR

For Air Coolers with draw-through fans, on site assembly. Suitable for air conditioning or heating in the winter.

Only for use with running air cooler fans so that the ceiling of the cold storage areas does not overheat. Please observe the respective safety guidelines.

Scope of delivery: • Electric finned tube heater in stainless steel
• Connection ends: 1.5 x 2000 mm • Assembly kit • Connection box IP 54

a)



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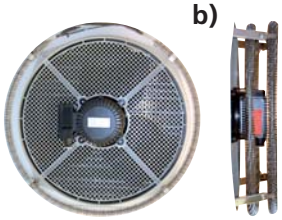
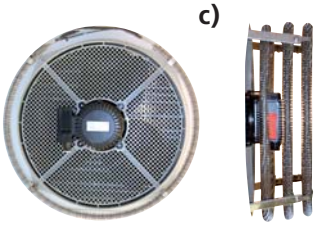


c)



Model	for blade	Nominal rating at 230 V	Weight	Model	for blade	Nominal rating at 230 V	Weight
	Ø mm	kW	kg		Ø mm	kW	kg
SGHR 50	500	3,19	1,13	**SGHR 50 Z**	500	3,19	1,13
SGHR 56	560	3,51	1,27	**SGHR 56 Z**	560	3,51	1,27
SGHR 63	630	8,08	2,68	**SGHR 63 Z**	630	4,04	1,34
SGHR 71	710	9,48	3,23	**SGHR 71 Z**	710	4,74	1,51
SGHR 80	800	10,5	3,40	**SGHR 80 Z**	800	5,24	1,70

Selection table

For Air Coolers	Normal heating capacity		Greater heating capacity	
	kW	Number to order	kW	Number to order
SG 50-1	3,19	a) 1 SGHR 50	6,38	b) 1 SGHR 50 + 1 SGHR 50Z
SG 56-1	3,51	a) 1 SGHR 56	7,02	b) 1 SGHR 56 + 1 SGHR 56Z
SG 63-1	8,08	b) 1 SGHR 63	12,1	c) 1 SGHR 63 + 1 SGHR 63Z
SG 71-1	9,48	b) 1 SGHR 71	14,2	c) 1 SGHR 71 + 1 SGHR 71Z
SG 80-1	10,5	b) 1 SGHR 80	15,8	c) 1 SGHR 80 + 1 SGHR 80Z
SG 50-2	6,38	a) 2 SGHR 50	12,8	b) 2 SGHR 50 + 2 SGHR 50Z
SG 56-2	7,02	a) 2 SGHR 56	14,0	b) 2 SGHR 56 + 2 SGHR 56Z
SG 63-2	16,2	b) 2 SGHR 63	24,2	c) 2 SGHR 63 + 2 SGHR 63Z
SG 71-2	19,0	b) 2 SGHR 71	28,4	c) 2 SGHR 71 + 2 SGHR 71Z
SG 80-2	21,0	b) 2 SGHR 80	31,6	c) 2 SGHR 80 + 2 SGHR 80Z
SG 50-3	9,57	a) 3 SGHR 50	19,1	b) 3 SGHR 50 + 3 SGHR 50Z
SG 56-3	10,5	a) 3 SGHR 56	21,1	b) 3 SGHR 56 + 3 SGHR 56Z
SG 63-3	24,3	b) 3 SGHR 63	36,3	c) 3 SGHR 63 + 3 SGHR 63Z
SG 71-3	28,5	b) 3 SGHR 71	42,6	c) 3 SGHR 71 + 3 SGHR 71Z
SG 80-3	31,5	b) 3 SGHR 80	47,4	c) 3 SGHR 80 + 3 SGHR 80Z
SG 50-4	12,8	a) 4 SGHR 50	25,5	b) 4 SGHR 50 + 4 SGHR 50Z
SG 56-4	14,1	a) 4 SGHR 56	28,1	b) 4 SGHR 56 + 4 SGHR 56Z
SG 63-4	32,2	b) 4 SGHR 63	48,4	c) 4 SGHR 63 + 4 SGHR 63Z
SG 71-4	38,0	b) 4 SGHR 71	56,8	c) 4 SGHR 71 + 4 SGHR 71Z
SG 80-4	42,0	b) 4 SGHR 80	63,2	c) 4 SGHR 80 + 4 SGHR 80Z
SG 50-5	15,9	a) 5 SGHR 50	31,9	b) 5 SGHR 50 + 5 SGHR 50Z
SG 56-5	17,6	a) 5 SGHR 56	35,1	b) 5 SGHR 56 + SGHR 56Z
SG 63-5	40,4	b) 5 SGHR 63	60,5	c) 5 SGHR 63 + SGHR 63Z

Accessories

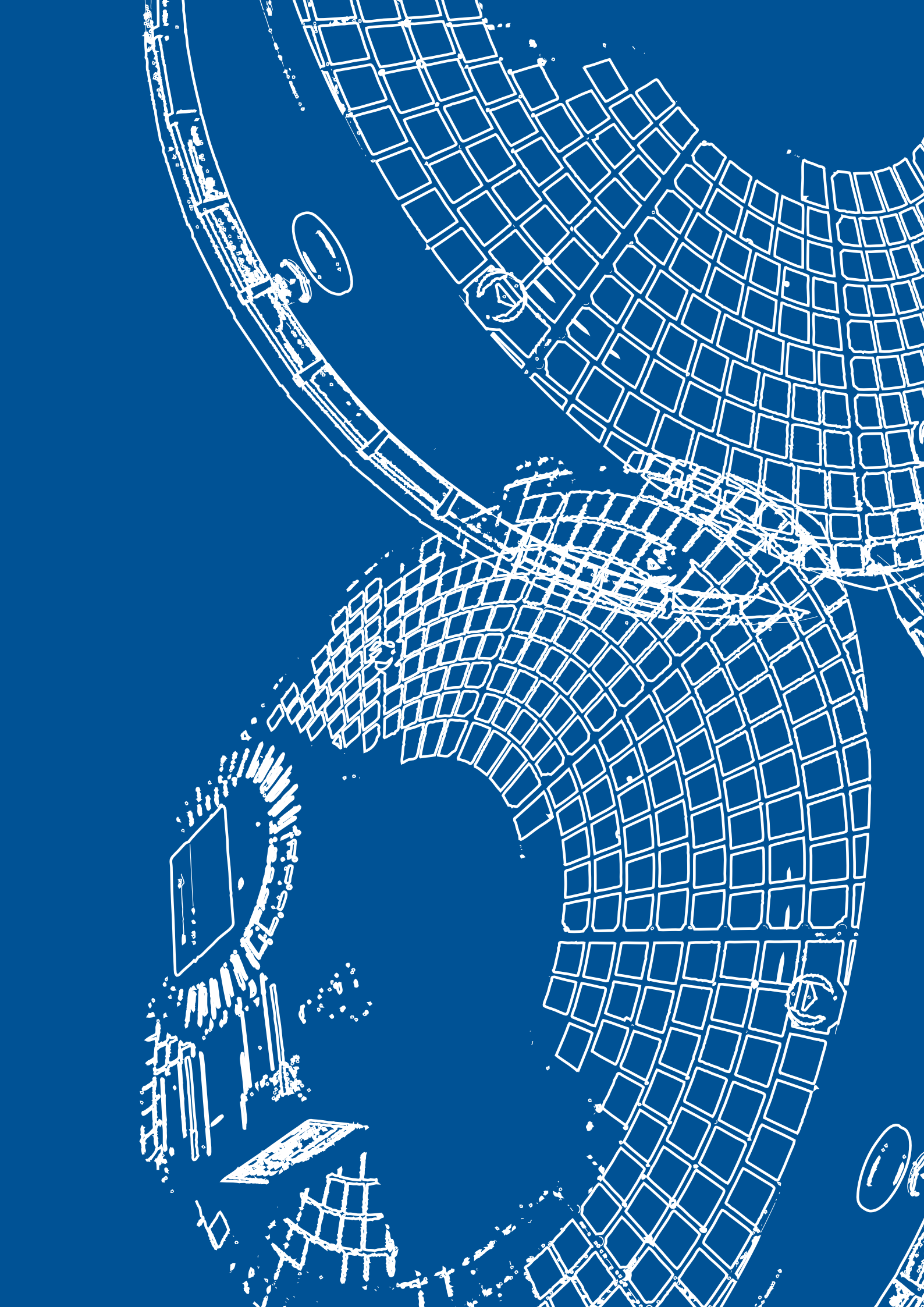
Air hoses (on site procurement, not available from Küba)

Ventilation can be optimised with textile / PVC air hoses.

Applications
- Applications in work rooms and production areas
- Cooled goods that are sensitive to drafts (e.g. flowers, ripening cheeses)

Advantages
The air hoses make uniform air distribution possible at very low air speeds.
- Working in a draft-free environment yields low illness rates
- Maximum protection for sensitive cooled goods
- No condensation water: temperatures do not fall below the dew point because air can penetrate the woven material

Calculation hints
Please take the respective pressure drop for the cooler design into consideration.

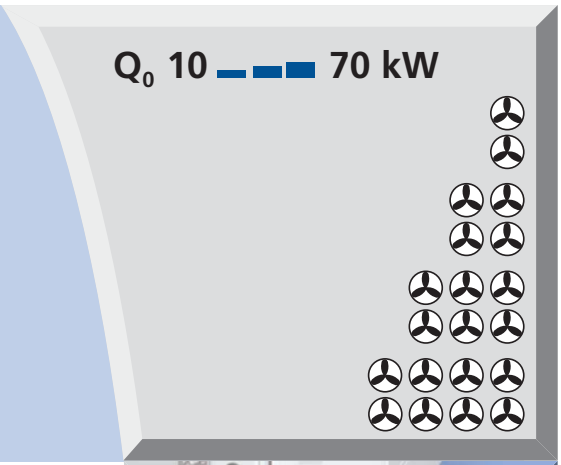


Küba SF *blastfreezer*

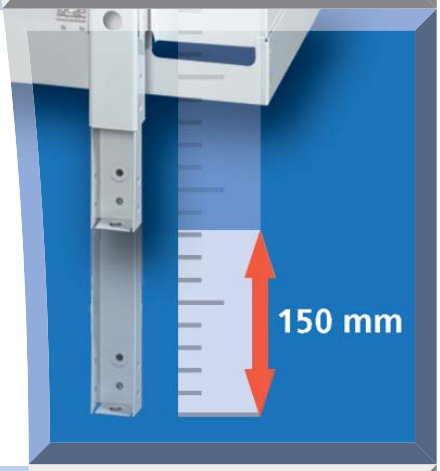
Küba SF *blastfreezer*: Specific advantages

High performance Air Cooler for shock cooling and freezing meat and sausage products, baked goods, pizza and frozen vegetables.

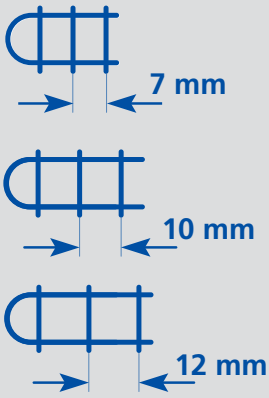
Blow-through fans guide the air flow horizontally through the heat exchanger. This achieves optimum air speeds.



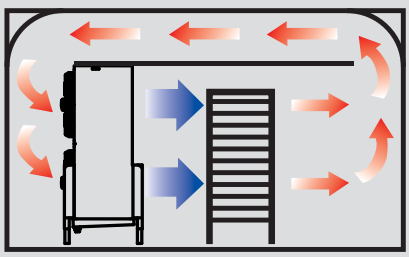
Adjustable floor brackets: can be perfectly adapted to on site conditions.



Large fin spacing guarantees quick cooling process and long evaporator operating periods.

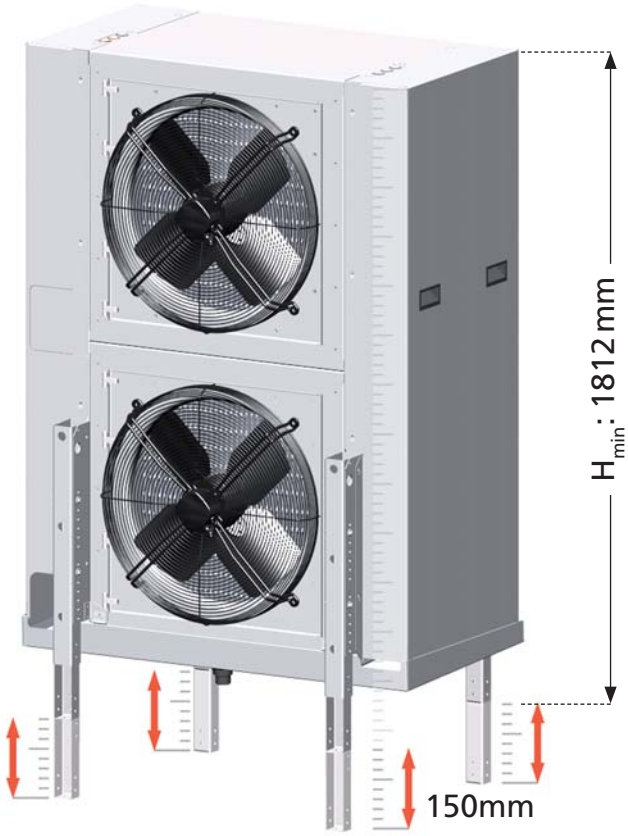


High air circulation rate with indirect air flow over the cooled goods: more cost-effective, the products retain their quality and reach the proper core temperature as quickly as possible.



Küba SF *blastfreezer*: Specific advantages

- Optimum air flowrate for blast freezing: maximum air speed for the cooled goods located in the air flow
- Dimensions correspond with standard tray carts: perfect cool air distribution directly over the cooled goods
- Outstanding Küba quality: with HFE® tube / fin system and CAL® refrigerant distributor
- Adjustable floor mounting brackets: can be perfectly adapted to on site conditions
- Hinge-down drip tray on both sides: standard



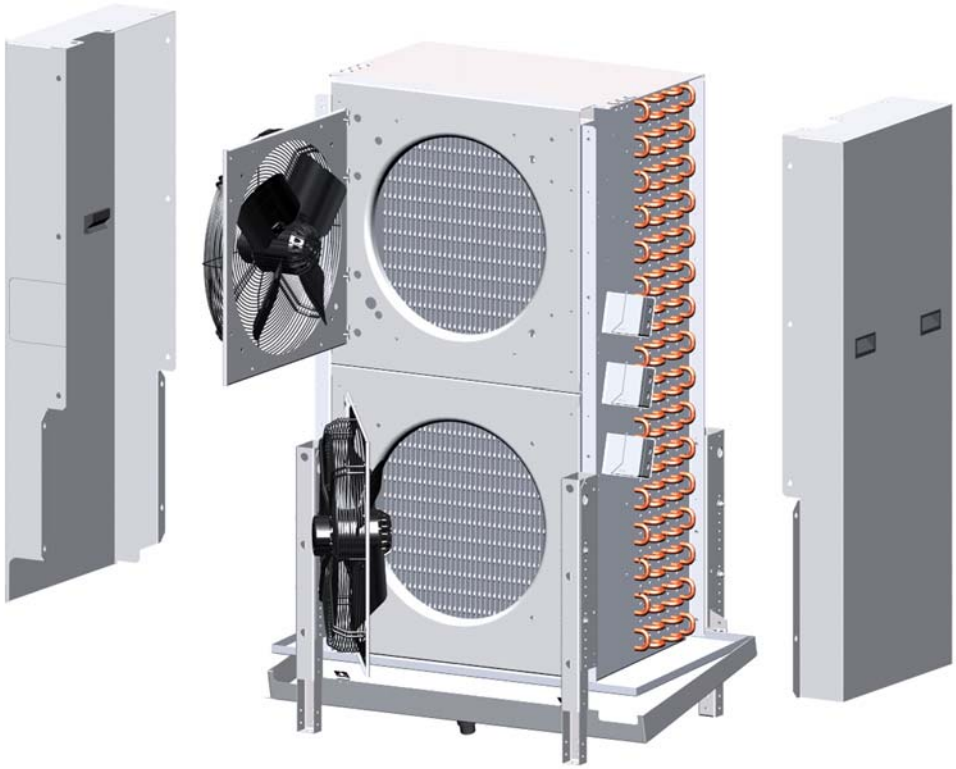
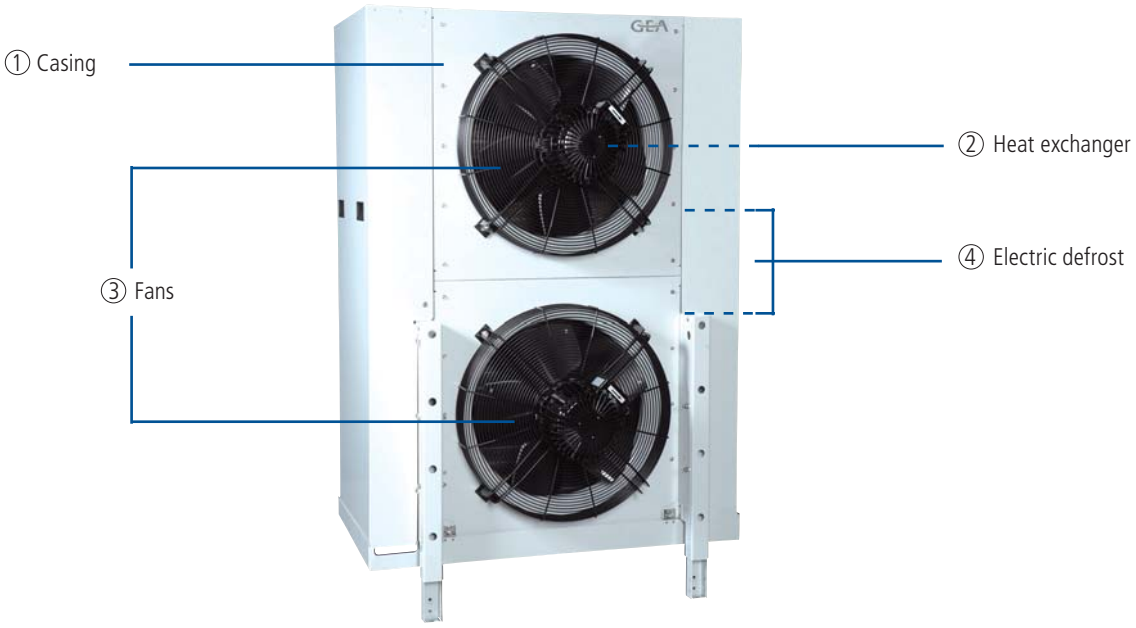


Illustration shows accessories: cover hoods on the sides for the connection and frame return bends side.

Construction



1. Casing

- Smooth Sendzimir galvanised steel
- High-grade powder coating, papyrus white RAL 9018
  - Food quality
  - Easy to clean
  - Optimum corrosion protection
- Fold-down drip tray
- Floor mounting brackets on both sides adjustable in 25 mm increments to 150 mm
- Drain: plastic

2. Heat exchanger

- Fin spacing
  SFB: 7 mm
  SFK: 10 mm
  SFL: 12 mm
- Tube arrangement aligned, spacing 50 x 50 mm
- HFE® tube / fin system
- Multiple injection with Küba CAL® refrigerant distributor
- Tubing: Cu-special
  Fins: Al
  End plates: Al

3. Fans

- Ø 560 mm
- With built-in protector to be connected on site
- Application range: - 50 °C to + 60 °C
- 400 ±10%V-3~,50 Hz
- Protection class IP 54 in accordance with EN 60034
- Insulation class F in accordance with EN 60034
- Standard: 50 Pa external pressure
- Version V1.60: 100 Pa external pressure

- Operating data can be found with Küba Select or in the technical data

• Controller:	Standard 50 Pa	V1.60 100 Pa
Phase control	☑	☐
Transformer	☑	☐
Delta / star	☑	☐
Frequency converter	☐	☑

⚠ Please observe the manufacturer's information.

Motor label data (max. allowable value +40 °C)

	Standard (Δp ext.=50 Pa)			V1.60 (Δp ext.=100 Pa)		
	min^{-1}	W	A	min^{-1}	W	A
SF 56 – F42-F68 Y	1130	450	0,73	not possible		
SF 56 – F42-F68 Δ	1360	670	1,30	1400	2500	4,45

4. Electric defrost

- 230 ±10% ~ oder 400 ±10% V-3~ -Y
- Heaters with CrNi steel sleeve
- Vapour-tight connections
- Connector cable 1.5 mm^2 x 1000 mm
- Designed to defrost the fin package quickly and evenly
- To prevent vapour build-up and to accomplish heat exchange with almost no loss, the heaters are mounted in special expanded tube sleeves
- Wired ready for connection to the connection box in accordance with VDE specifications

Refrigerant / coolant

- Can be used with all HFC refrigerants, performance data can be found with Küba Select
- For use with water / brine circulation please contact our sales team
- For CO_2-operation please contact our sales team
- For NH_3-applications please contact our sales team

! The ratings in the Q_V chart refer to the combination of materials as follows: tubes, Cu / fins, Al.

Küba Blue Line
Freshness that lasts longer

Technical data (R404A) SF...C 7 / 10 / 12 mm

Standard (50Pa external pressure)

SF	L	E	56	-	F	6	6	C

- Generation model
- Line designation
- Fin spacing: B = 7 mm, K = 10 mm, L = 12 mm
- Electric defrost: E = with electric defrost
- Number of fans: 2-8
- Coil depth: 4 tubes, 6 tubes
- Refrigerant: F = FKW/CO_2
- Fan diameter: 56 = 560 mm

SFB(E)-F Standard design [50Pa external pressure] 7 mm

Model SF.C	Rating Q_0 at 50 Hz t_{L1}=-18 °C DT1 = 7K NB 3	Rating Q_0 at 50 Hz t_{L1}=-25°C DT1 = 6K NB 4	Surface	Air flow rate	Air speed	Tube volume	Connections Inlet	Connections Outlet	Fans (operating values at 50 Hz) Blade	Fans (operating values at 50 Hz) Fan 400 ± 10% V-3~ 50Hz		
	kW	kW	m²	m³/h	m/s	dm³	ø mm	ø mm	ø mm	min-1	W	A
56-F42	14,0	11,3	77	13000	2,82	19,8	15	35	560	1360	710	1,41
56-F62	18,0	14,5	115	12320	2,67	29,7	22	42	560	1360	710	1,41
56-F44	28,1	22,6	154	26000	2,82	37,7	22	42	560	1360	710	1,41
56-F64	36,0	29,0	231	24640	2,67	56,8	28	54	560	1360	710	1,41
56-F66	53,8	43,3	346	36950	2,67	82,7	2x22	2x42	560	1360	710	1,41
56-F68	70,3	56,8	462	49270	2,67	110,1	2x22	2x54	560	1360	710	1,41

SFK(E)-F Standard design [50Pa external pressure] 10 mm

Model SF.C	Rating Q_0 at 50 Hz t_{L1}=-18 °C DT1 = 7K NB 3	Rating Q_0 at 50 Hz t_{L1}=-25°C DT1 = 6K NB 4	Surface	Air flow rate	Air speed	Tube volume	Connections Inlet	Connections Outlet	Fans (operating values at 50 Hz) Blade	Fans (operating values at 50 Hz) Fan 400 ± 10% V-3~ 50Hz		
	kW	kW	m²	m³/h	m/s	dm³	ø mm	ø mm	ø mm	min-1	W	A
56-F42	11,7	9,4	56	13300	2,89	19,8	15	35	560	1360	710	1,41
56-F62	15,7	12,7	83	13060	2,83	29,7	22	42	560	1360	710	1,41
56-F44	23,5	18,9	111	26600	2,89	37,7	22	42	560	1360	710	1,41
56-F64	31,6	25,4	166	26120	2,83	56,8	28	54	560	1360	710	1,41
56-F66	47,1	38,0	249	39180	2,83	82,7	2x22	2x42	560	1360	710	1,41
56-F68	62,0	50,0	332	52240	2,83	110,1	2x22	2x54	560	1360	710	1,41

SFL(E)-F Standard design [50Pa external pressure] 12 mm

Model SF.C	Rating Q_0 at 50 Hz t_{L1}=-18 °C DT1 = 7K NB 3	Rating Q_0 at 50 Hz t_{L1}=-25°C DT1 = 6K NB 4	Surface	Air flow rate	Air speed	Tube volume	Connections Inlet	Connections Outlet	Fans (operating values at 50 Hz) Blade	Fans (operating values at 50 Hz) Fan 400 ± 10% V-3~ 50Hz		
	kW	kW	m²	m³/h	m/s	dm³	ø mm	ø mm	ø mm	min-1	W	A
56-F42	10,3	8,3	47	13520	2,93	19,8	15	35	560	1360	710	1,41
56-F62	14,0	11,3	71	13260	2,88	29,7	22	42	560	1360	710	1,41
56-F44	20,7	16,6	94	27040	2,93	37,7	22	42	560	1360	710	1,41
56-F64	28,1	22,6	141	26520	2,88	56,8	28	54	560	1360	710	1,41
56-F66	42,0	33,9	212	39780	2,88	82,7	2x22	2x42	560	1360	710	1,41
56-F68	55,4	44,7	282	53040	2,88	110,1	2x22	2x54	560	1360	710	1,41

Technical data (R404A) SF...C 7 / 10 / 12 mm

SFB(E)-F Version V1.60 [100Pa external pressure]

7 mm

Model SF.C		Rating Q_0 at 50 Hz t_{L1}=-18 °C DT1 = 7K NB 3	Rating Q_0 at 50 Hz t_{L1}=-25°C DT1 = 6K NB 4	Surface	Air flow rate	Air speed	Tube volume	Connections Inlet	Connections Outlet	Fans (operating values at 50 Hz) Blade	Fans (operating values at 50 Hz) Fan 400 ± 10% V-3~ 50Hz		
		kW	kW	m²	m³/h	m/s	dm³	ø mm	ø mm	ø mm	min-1	W	A
56-F42		16,9	13,6	77	17430	3,78	19,8	15	35	560	1400	2570	4,30
56-F62		22,2	17,8	115	16730	3,63	29,7	22	42	560	1400	2570	4,30
56-F44		34,0	27,2	154	34860	3,78	37,7	22	42	560	1400	2570	4,30
56-F64		44,6	35,7	231	33460	3,63	56,8	28	54	560	1400	2570	4,30
56-F66		66,5	53,2	346	50190	3,63	82,7	2x22	2x42	560	1400	2570	4,30
56-F68		85,9	68,7	462	66920	3,63	110,1	2x22	2x54	560	1400	2570	4,30

SFK(E)-F Version V1.60 [100Pa external pressure]

10 mm

Model SF.C		Rating Q_0 at 50 Hz t_{L1}=-18 °C DT1 = 7K NB 3	Rating Q_0 at 50 Hz t_{L1}=-25°C DT1 = 6K NB 4	Surface	Air flow rate	Air speed	Tube volume	Connections Inlet	Connections Outlet	Fans (operating values at 50 Hz) Blade	Fans (operating values at 50 Hz) Fan 400 ± 10% V-3~ 50Hz		
		kW	kW	m²	m³/h	m/s	dm³	ø mm	ø mm	ø mm	min-1	W	A
56-F42		13,5	10,8	56	18010	3,91	19,8	15	35	560	1400	2570	4,30
56-F62		19,3	15,5	83	17360	3,77	29,7	22	42	560	1400	2570	4,30
56-F44		27,0	21,6	111	36020	3,91	37,7	22	42	560	1400	2570	4,30
56-F64		38,8	31,1	166	34720	3,77	56,8	28	54	560	1400	2570	4,30
56-F66		57,9	46,3	249	52080	3,77	82,7	2x22	2x42	560	1400	2570	4,30
56-F68		75,3	60,3	332	69440	3,77	110,1	2x22	2x54	560	1400	2570	4,30

SFL(E)-F Version V1.60 [100Pa external pressure]

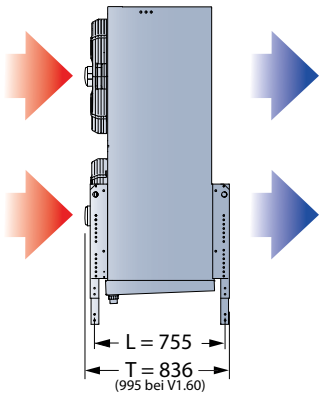
12 mm

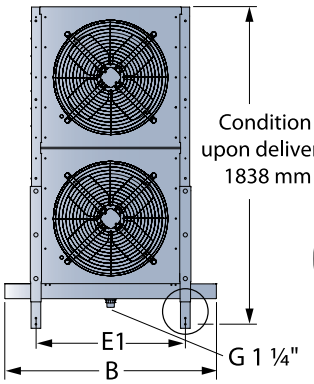
Model SF.C		Rating Q_0 at 50 Hz t_{L1}=-18 °C DT1 = 7K NB 3	Rating Q_0 at 50 Hz t_{L1}=-25°C DT1 = 6K NB 4	Surface	Air flow rate	Air speed	Tube volume	Connections Inlet	Connections Outlet	Fans (operating values at 50 Hz) Blade	Fans (operating values at 50 Hz) Fan 400 ± 10% V-3~ 50Hz		
		kW	kW	m²	m³/h	m/s	dm³	ø mm	ø mm	ø mm	min-1	W	A
56-F42		11,9	9,5	47	18390	3,99	19,8	15	35	560	1400	2570	4,30
56-F62		17,3	13,8	71	17800	3,86	29,7	22	42	560	1400	2570	4,30
56-F44		23,9	19,1	94	36780	3,99	37,7	22	42	560	1400	2570	4,30
56-F64		34,7	27,8	141	35600	3,86	56,8	28	54	560	1400	2570	4,30
56-F66		51,7	41,4	212	53400	3,86	82,7	2x22	2x42	560	1400	2570	4,30
56-F68		67,8	54,2	282	71200	3,86	110,1	2x22	2x54	560	1400	2570	4,30

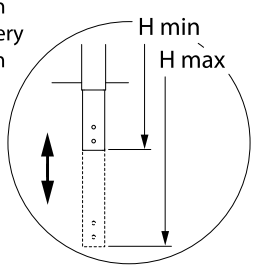
Dimensional drawings, dimensions, electric defrost, weights

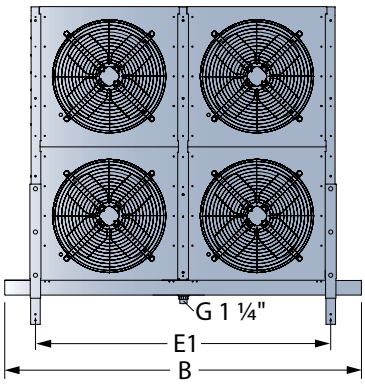
Model							Electrical defrost			Weight [Net]		
	Adjustable in 25 mm increments						230V-1~ / 400V-3~ -Y					
SF.C	H_{min}	H_{max}	B	E1	E2	E3	Coil	Tray	Total	SFB.C	SFK.C	SFL.C
	mm	mm	mm	mm	mm	mm	kW	kW	kW / *	kg	kg	kg
56-F42	1813	1963	1210	854	-	-	8,60	1,72	10,32 / 3	168	163	159
56-F62	1813	1963	1210	854	-	-	12,90	1,72	14,62 / 3	200	192	187
56-F44	1813	1963	2010	1654	-	-	14,35	2,87	17,22 / 3	287	276	269
56-F64	1813	1963	2010	1654	-	-	21,53	2,87	24,40 / 3	346	330	320
56-F66	1813	1963	2810	2454	800	-	30,00	4,00	34,00 / 3	497	473	457
56-F68	1813	1963	3610	3254	800	2400	40,80	5,20	46,00 / 3	669	637	616

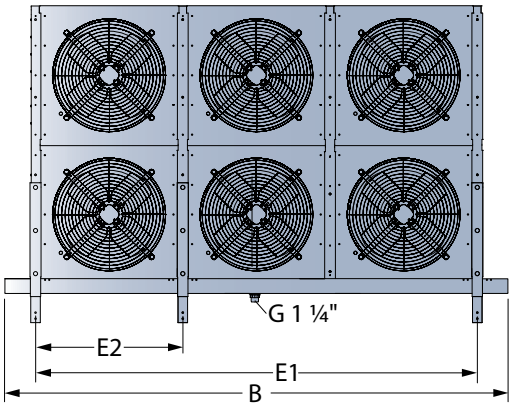
* Electric defrost divided in /n circuits

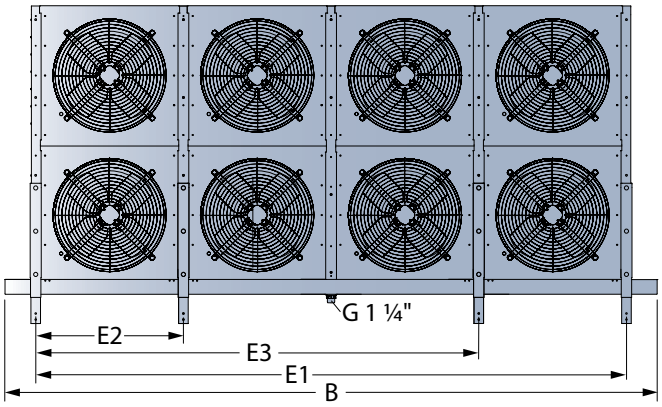


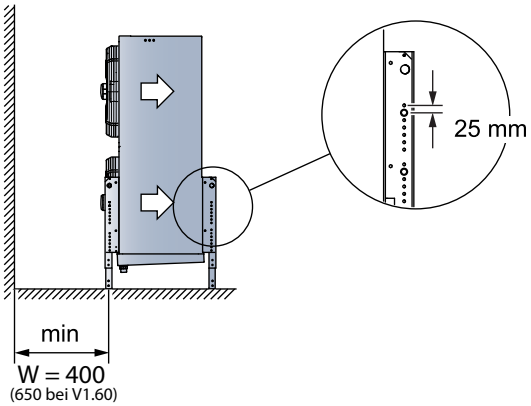




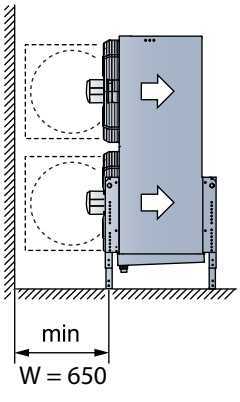








Wall clearance: Standard



Wall clearance: Model with hinged fans (V3.10)

Versions

Motor versions

Fans with high external pressure (100 Pa)
- **V1.60**

For other alternative motor versions, see Küba Select or version overview, p. 130

Alternative casing versions

Hinged fans
- **V3.10**

To make the devices easy to clean, the fans are mounted with stainless steel hinges.

Defrost versions

All Küba Air Coolers are available with electric defrosting. See nomenclature, p. 103

Hot gas defrost in the drip tray
- Hot gas connection on both sides
- V4.01 Copper
- V4.02 Stainless steel

Hot gas in the heat exchanger
- V6.05 Hot gas connection on the heat exchanger

Protection against corrosion

Stainless steel casing
- **V3.12**

For protection in aggressive cold storage air, e.g. in smokehouses and curing areas, all casing components are stainless steel. Industrial quality.

- **V6.01**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al protective coating

Casing: Sendzimir galvanised steel, protective coating on both sides

- **V6.02**

Heat exchanger:
Tubing: Stainless steel
Fins: Al „goldlack“ coating
End plates: Stainless steel

Casing: Sendzimir galvanised steel protective coating on both sides
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **V6.03**

Heat exchanger:
Tubing: Stainless steel
Fins: Al
End plates: Al protective coating

Casing: Sendzimir galvanised steel, protective coating on one side
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **V6.04**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al

Casing: Sendzimir galvanised steel, protective coating on one side

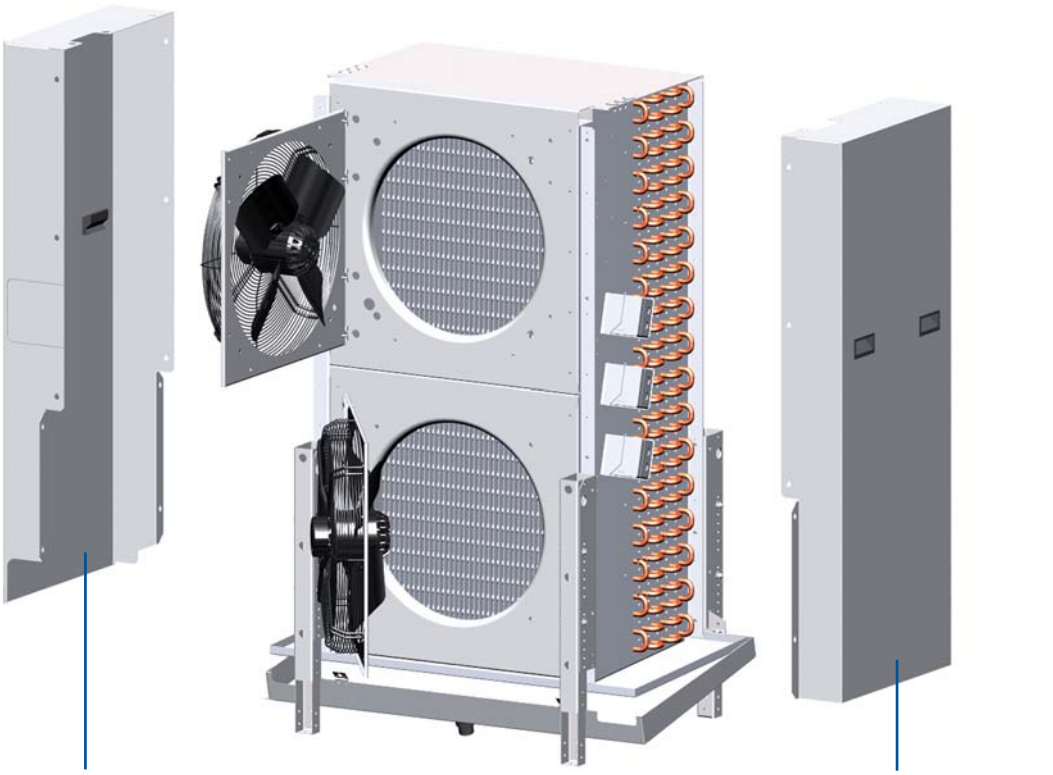
Accessories

Side cover hoods

The cover hoods can be used with all models.

Construction

- Sendzimir galvanised steel
- High-grade powder coating, papyrus white RAL 9018



Connection side (AS)

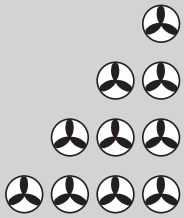
Return bends site (BS)

Küba DZ *production*

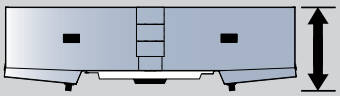
Küba DZ *production*: Specific advantages

Our dual discharge Küba DZ *production* is designed for use in production and work rooms such as in slaughterhouses and dairies.

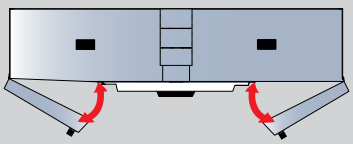
Q_0 3 – 78 kW



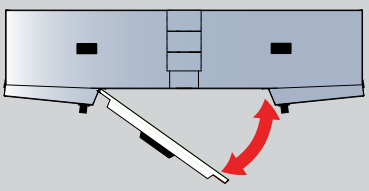
The low profile ceiling design enables optimum use of area space and perfect cool air distribution in normal cold stores as well as in large refrigerated warehouses.



Even the standard design includes the hinge-down drip tray. This makes it easy to clean the cooler and it is easy to assemble and to make service work easy.



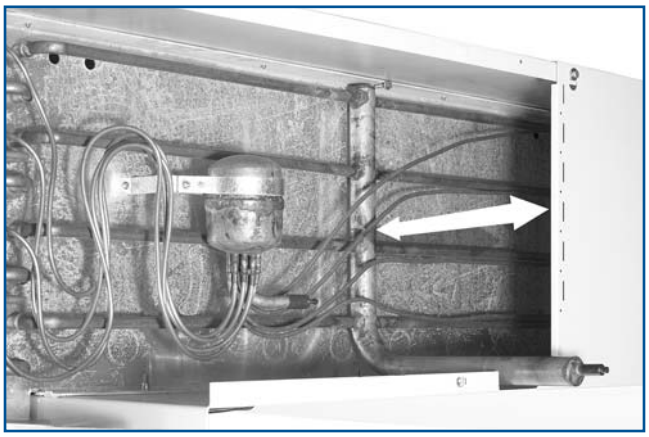
To meet the strictest hygiene requirements the Küba DZ *production* can be cleaned quickly and easily, thanks to its optional hinged fans.



Küba DZ *production*: Specific advantages

1. Quick installation

The generously sized installation area allows components such as expansion valves, solenoid valves to be mounted easily.



2. Hygiene

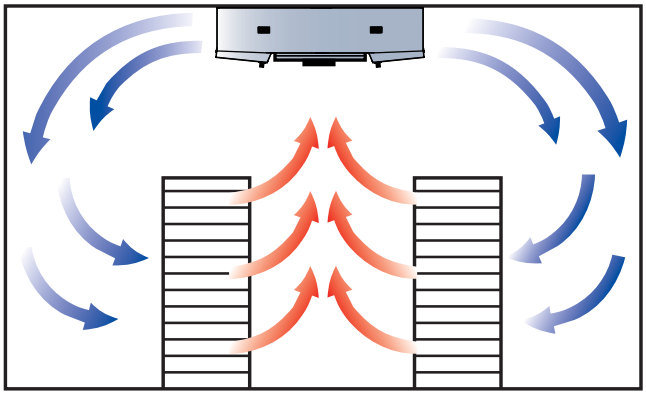
Even in the standard design the brackets are designed such that the Air Coolers can be mounted as desired:

- Flush with the ceiling for the hygienic area
- With a clearance of 20 mm from the ceiling for deep-freeze applications an insulating air cushion is generated.

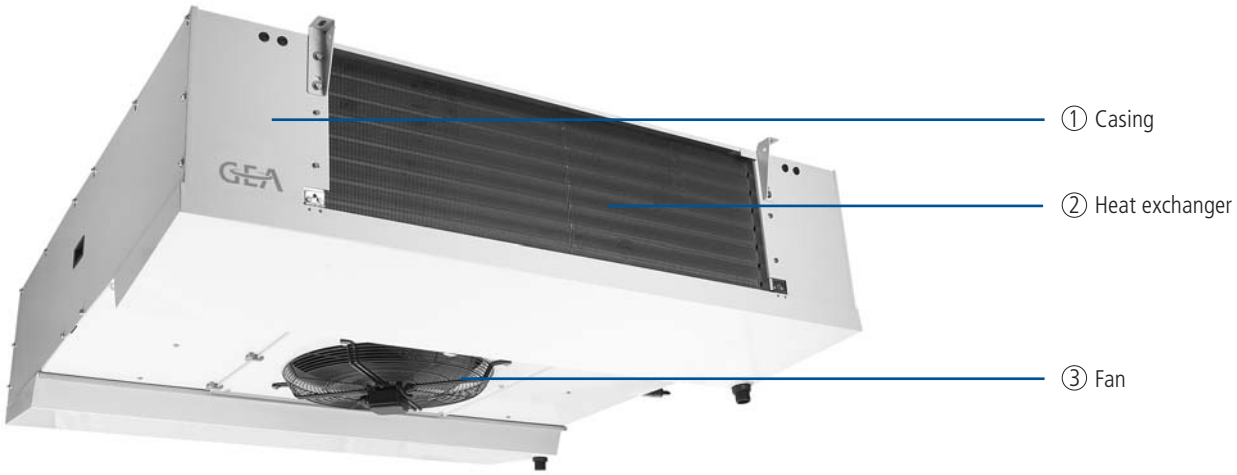
The adjustment can be made on site by simply moving the brackets. The standard ceiling clearance is 20 mm. However, when an order is placed, this specification can be given as 3 mm.

3. Ventilation

Air is discharged evenly on both sides of the air cooler. When it is mounted in the centre of the room or between suspension racks, it provides air circulation on both sides, resulting in homogeneous room conditions and uniform cooling of the products:



Construction



1. Casing

- Smooth Sendzimir galvanised steel
- High-grade powder coating, papyrus white RAL 9018
  - Food quality
  - Easy to clean
  - Optimum corrosion protection
- Hinge-down drip tray and removable side panels
- Stainless steel mounting material
- Plastic drain up to 1 1/4“ longer than 2“, stainless steel

2. Heat exchanger

- Fin spacing
  DZA: 4,5 mm
  DZB: 7 mm
  DZK: 12 mm
- Tube arrangement aligned, spacing 50 x 50 mm
- HFE® tube / fin system
- **DZ *production*-F: FKW / CO_2**
  Küba-CAL®-refrigerant distributor for multiple injection
  Tubing: Cu-special
  Fins: Al
  End plates: Al
- **DZ *production*-G: Glycol**
  Distributor tubes for multiple injection
  Tubing: Cu-special
  Fins: Al
  End plates: Al
- **DZ *production*-N: Pump operation, NH_3**
  Distributor tubes for multiple injection
  Tubing: VA
  Fins: Al
  End plates: Al

3. Fans

- Ø 400 / 450 / 500 / 560 mm
- With built-in protector to be connected on site
- Application range: - 40 °C to + 45 °C
- 400 ±10% V-3~, 50 Hz
- At maximum speed (Δ operation) only very minimal moisture discharge from the fins
- Protection class IP54 in accordance with EN 60529
- Insulation class F in accordance with EN 60034
- Operating data can be found with Küba Select or in the technical data
- Controller:

Phase control	☑
Transformer	☐
Delta / star	☑
Frequency converter	☑

⚠ Please observe the manufacturer‘s information.

Motor label data (max. allowable value +40 °C)

	Δ operation			Y operation		
	min^{-1}	W	A	min^{-1}	W	A
DZ 40 – F41-F64	1350	320	0,66	1050	230	0,38
DZ 45 – F41-F64	1330	640	1,10	970	430	0,70
DZ 50 – F41-F84	1320	820	1,50	1030	550	0,95
DZ 56 – F41-F84	1360	845	1,65	1090	640	1,05

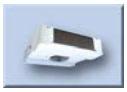
Construction

4. Electric defrost

- 230 ±10% V-1~ oder 400 ±10% V-3~ -Y
- Heaters with CrNi steel sleeve
- Vapour-tight connections
- Connector cable 1.5 mm^2 x 1000 mm
- Designed to defrost the fin package quickly and evenly
- To prevent vapour build-up and to accomplish heat exchange with almost no loss, the heaters are mounted in special expanded tube sleeves
- Wired ready for connection to the connection box in accordance with VDE specifications

The following designs are available on request:

- Special voltage on request
- Special design for frequency converter
- Hot air construction: up to +65 / +70 °C



Refrigerant / coolant

- Can be used with all HFC refrigerants, performance data can be found with Küba Select (Product Selection Software)
- For water / brine circulation choose your air cooler with Küba Select
- For CO_2 operation and for NH_3 applications immediate selection with Küba Select is possible; or ask our technical staff in sales

! The performance data in the Q_V charts refer to the combination of materials: tubes, Cu / fins, Al.

Küba Blue Line
Freshness that lasts longer

Technical data (R404A) DZA-F 4,5 mm

Nomenclature
Standard

DZ	B	E	50	-	F	6	4

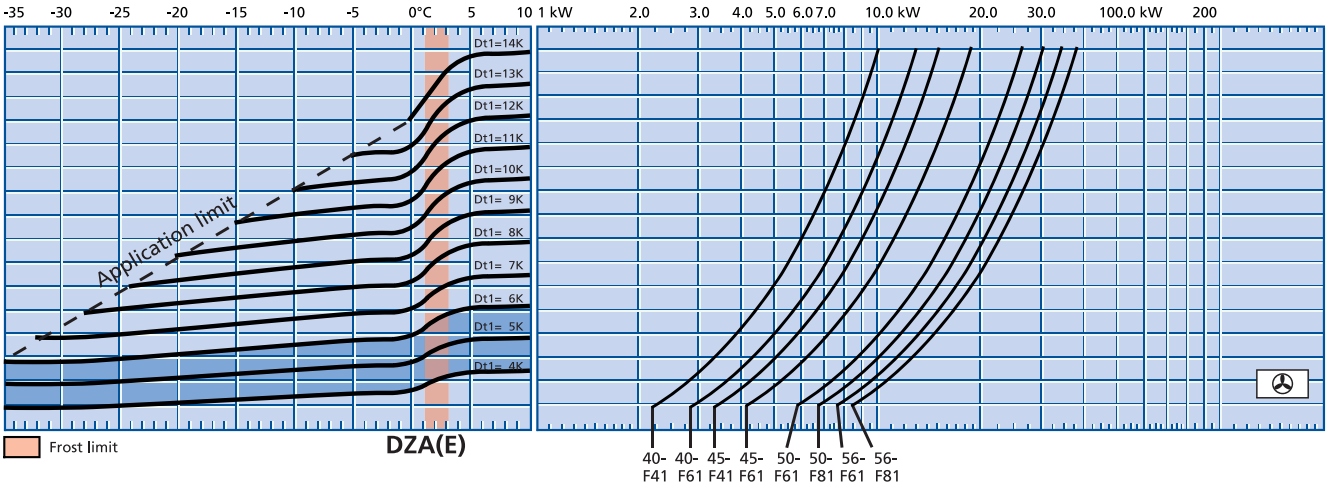
- Line designation
- Fin spacing: A = 4,5 mm; B = 7 mm; K = 10 mm
- Electric defrost: E = with electrical defrost
- Fan diameter: 40 = 400 mm; 45 = 450 mm; 50 = 500 mm; 56 = 560 mm
- Number of fans: 1-4
- Coil depth: 4 tubes; 6 tubes; 8 tubes
- Refrigerant: F = FKW/CO_2; G = Glycol; N = NH_3

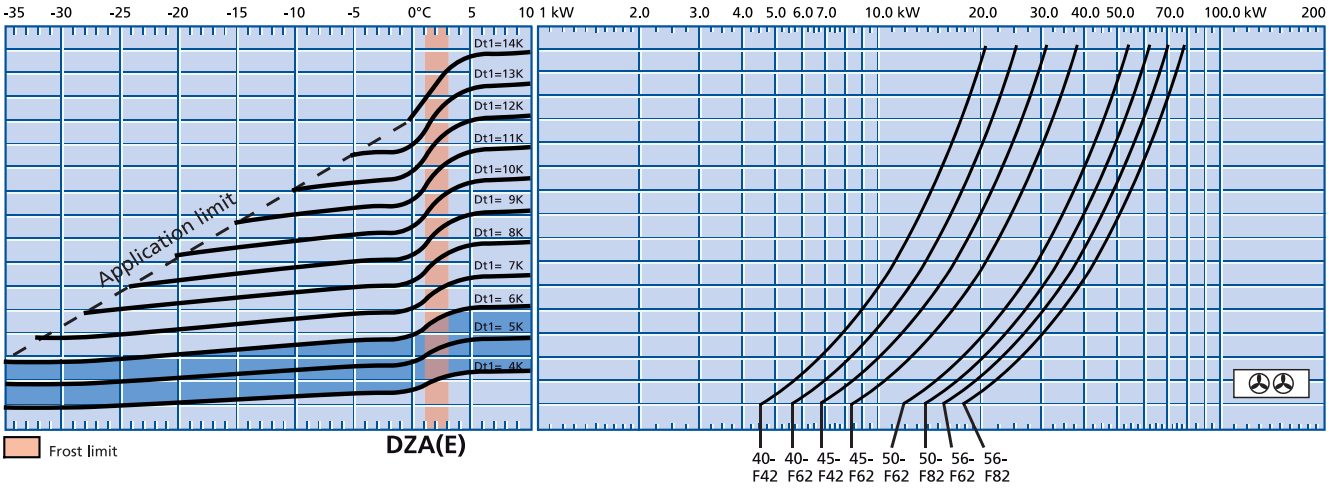
Model DZA(E)		Rating Q_0 at 50 Hz t_{L1} ±0 °C DT1 = 8K	t_{L1} -18 °C DT1 = 7K	Surface	Airflow	Air throw	Tube volume	Connections Inlet	Outlet	Blade	Per fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
40-F41	✇	5,0	4,0	33	2890	2 x 9	5	10	28	400	1350/1050	320/230	0,66/0,38
40-F61	✇	6,3	5,0	49	2720	2 x 9	8	10	28	400	1350/1050	320/230	0,66/0,38
45-F41	✇	7,6	6,1	44	4400	2 x 11	7	10	28	450	1330/970	640/430	1,10/0,70
45-F61	✇	9,4	7,5	66	4050	2 x 11	11	10	28	450	1330/970	640/430	1,10/0,70
50-F61	✇	13,4	10,7	110	5400	2 x 14	17	10	35	500	1330/1030	820/550	1,50/0,70
50-F81	✇	15,0	11,9	146	5175	2 x 14	23	15	35	500	1330/1030	820/550	1,50/0,70
56-F61	✇	17,3	13,8	132	7245	2 x 16	21	15	35	560	1360/1090	840/640	1,65/1,05
56-F81	✇	19,4	15,5	176	6975	2 x 16	28	15	35	560	1360/1090	840/640	1,65/1,05
40-F42	✇✇	10,1	8,0	66	5780	2 x 12	11	10	28	400	1350/1050	320/230	0,66/0,38
40-F62	✇✇	12,6	10,0	99	5440	2 x 12	16	10	35	400	1350/1050	320/230	0,66/0,38
45-F42	✇✇	15,2	12,1	88	8800	2 x 14	14	10	35	450	1330/970	640/430	1,10/0,70
45-F62	✇✇	18,8	15,0	132	8100	2 x 14	21	15	35	450	1330/970	640/430	1,10/0,70
50-F62	✇✇	26,8	21,4	220	10800	2 x 17	35	22	35	500	1330/1030	820/550	1,50/0,70
50-F82	✇✇	29,9	23,9	293	10350	2 x 17	46	22	42	500	1330/1030	820/550	1,50/0,70
56-F62	✇✇	34,5	27,6	264	14490	2 x 19	41	22	42	560	1360/1090	840/640	1,65/1,05
56-F82	✇✇	38,9	31,1	352	13950	2 x 19	55	22	42	560	1360/1090	840/640	1,65/1,05
40-F43	✇✇✇	15,1	12,0	99	8670	2 x 15	16	10	35	400	1350/1050	320/230	0,66/0,38
40-F63	✇✇✇	18,8	15,0	148	8160	2 x 15	25	15	35	400	1350/1050	320/230	0,66/0,38
45-F43	✇✇✇	22,8	18,2	132	13200	2 x 17	22	15	35	450	1330/970	640/430	1,10/0,70
45-F63	✇✇✇	28,2	22,5	198	12150	2 x 17	32	22	42	450	1330/970	640/430	1,10/0,70
50-F63	✇✇✇	40,2	32,1	329	16200	2 x 20	52	22	42	500	1330/1030	820/550	1,50/0,70
50-F83	✇✇✇	44,9	35,8	439	15525	2 x 20	70	22	42	500	1330/1030	820/550	1,50/0,70
56-F63	✇✇✇	51,8	41,3	395	21735	2 x 22	62	22	54	560	1360/1090	840/640	1,65/1,05
56-F83	✇✇✇	58,3	46,6	528	20925	2 x 22	83	2x22	2x42	560	1360/1090	840/640	1,65/1,05
40-F44	✇✇✇✇	20,1	16,1	132	11560	2 x 18	22	15	35	400	1350/1050	320/230	0,66/0,38
40-F64	✇✇✇✇	25,1	20,1	198	10880	2 x 18	33	22	35	400	1350/1050	320/230	0,66/0,38
45-F44	✇✇✇✇	30,4	24,3	176	17600	2 x 20	29	15	42	450	1330/970	640/430	1,10/0,70
45-F64	✇✇✇✇	37,6	30,0	264	16200	2 x 20	42	22	42	450	1330/970	640/430	1,10/0,70
50-F64	✇✇✇✇	53,5	42,8	439	21600	2 x 23	70	28	54	500	1330/1030	820/550	1,50/0,70
50-F84	✇✇✇✇	59,8	47,8	586	20700	2 x 23	93	2x22	2x42	500	1330/1030	820/550	1,50/0,70
56-F64	✇✇✇✇	69,0	55,1	527	28980	2 x 25	82	28	54	560	1360/1090	840/640	1,65/1,05
56-F84	✇✇✇✇	77,7	62,1	704	27900	2 x 25	110	2x22	2x42	560	1360/1090	840/640	1,65/1,05

Q_V chart (EN328, R404A) DZA-F 4,5 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity

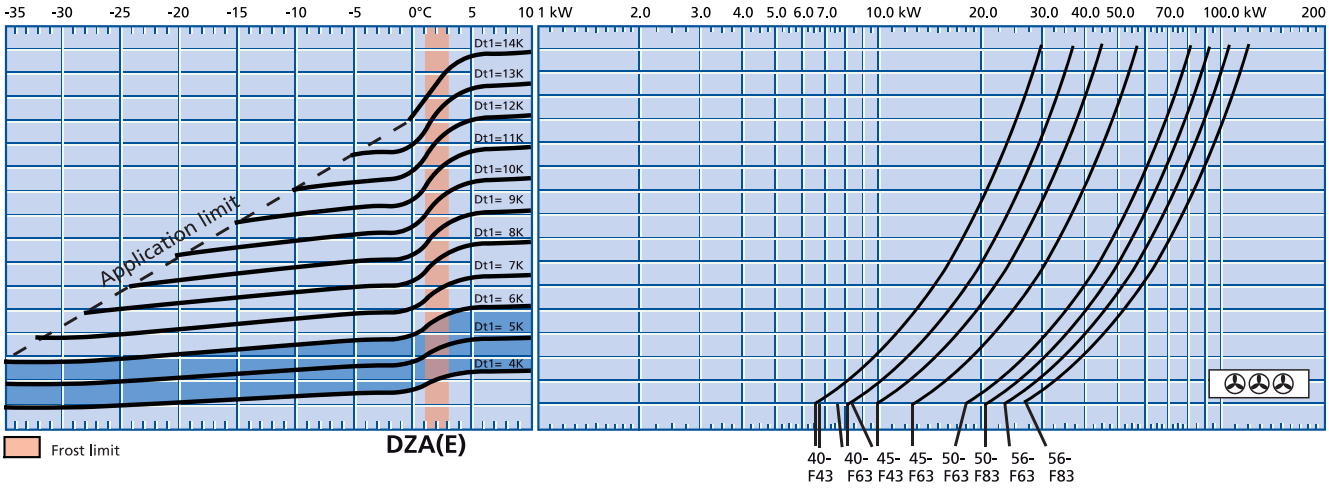


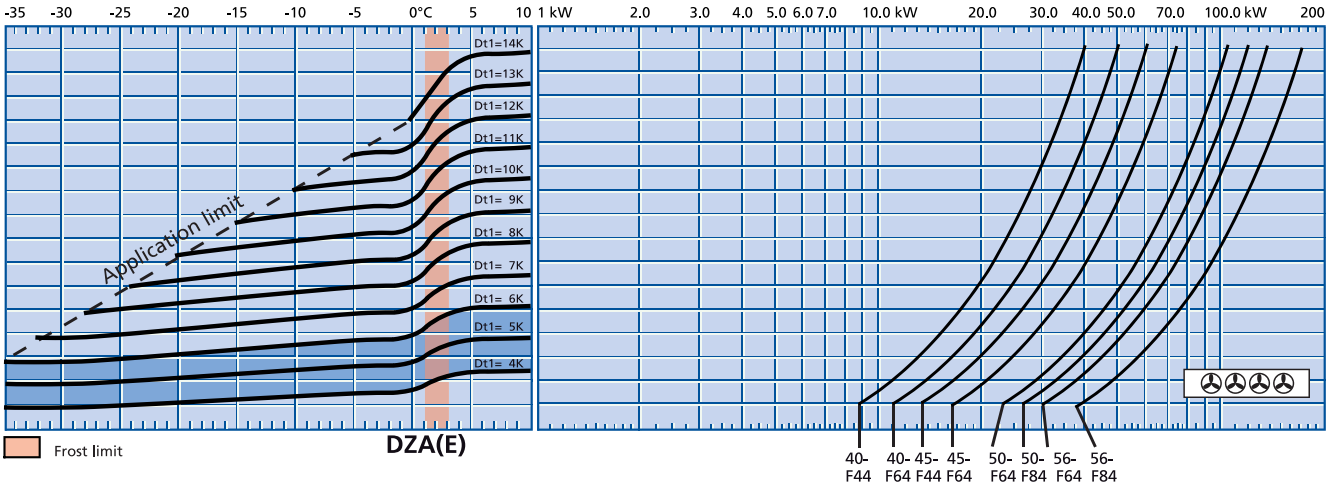


Q_V chart (EN328, R404A) DZA-F 4,5 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity

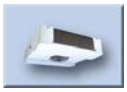




Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 **[°C]** = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference $= t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.



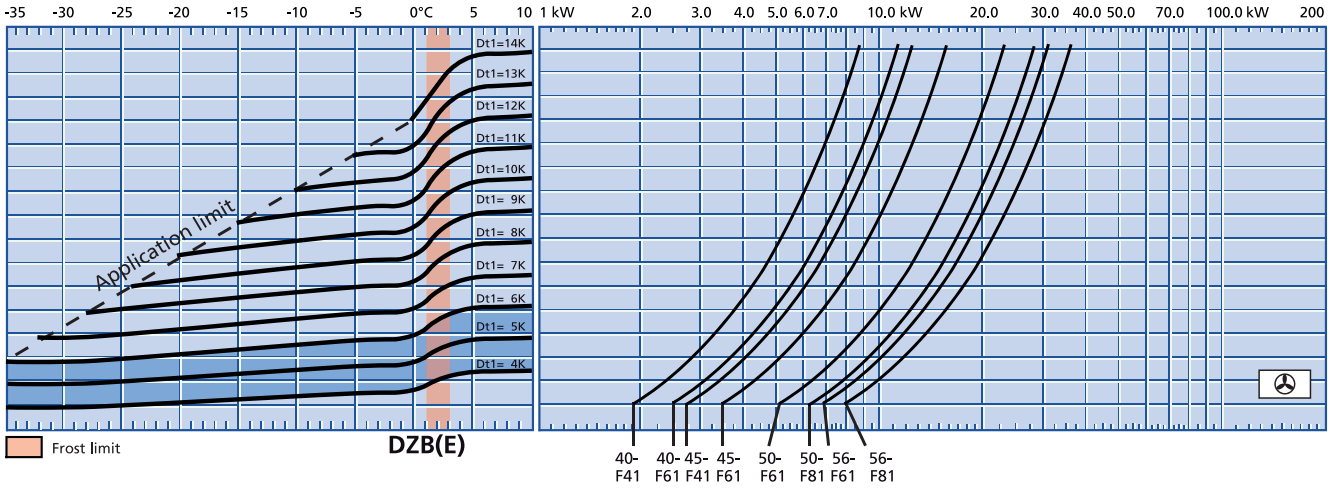
Technical data (R404A) DZB-F 7 mm

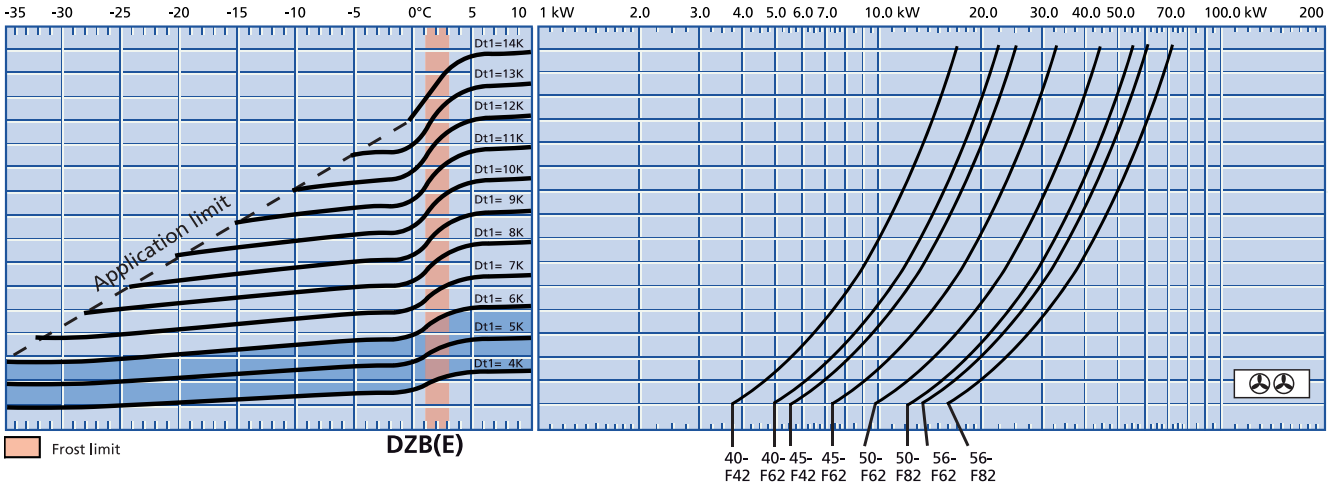
Model DZB(E)		Rating Q_0 at 50 Hz t_{t1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{t1} -18°C DT1 = 7K	Surface	Airflow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Blade	Per fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
40-F41	✇	4,2	3,3	22	3140	2 x 10	5	10	28	400	1350/1050	320/230	0,66/0,38
40-F61	✇	5,5	4,4	33	2980	2 x 10	8	10	28	400	1350/1050	320/230	0,66/0,38
45-F41	✇	6,0	4,8	29	4545	2 x 12	7	10	28	450	1330/970	640/430	1,10/0,70
45-F61	✇	7,7	6,1	43	4275	2 x 12	11	10	28	450	1330/970	640/430	1,10/0,70
50-F61	✇	11,4	9,1	72	5670	2 x 15	17	10	35	500	1330/1030	820/550	1,50/0,70
50-F81	✇	13,7	10,9	96	5580	2 x 15	23	15	35	500	1330/1030	820/550	1,50/0,70
56-F61	✇	15,0	12,0	87	7740	2 x 17	21	15	35	560	1360/1090	840/640	1,65/1,05
56-F81	✇	17,7	14,1	116	7560	2 x 17	28	15	35	560	1360/1090	840/640	1,65/1,05
40-F42	✇✇	8,4	6,7	44	6280	2 x 13	11	10	28	400	1350/1050	320/230	0,66/0,38
40-F62	✇✇	11,0	8,8	65	5960	2 x 13	16	10	35	400	1350/1050	320/230	0,66/0,38
45-F42	✇✇	12,0	9,6	58	9090	2 x 15	14	10	35	450	1330/970	640/430	1,10/0,70
45-F62	✇✇	15,3	12,3	87	8550	2 x 15	21	15	35	450	1330/970	640/430	1,10/0,70
50-F62	✇✇	22,8	18,2	145	11340	2 x 18	35	22	35	500	1330/1030	820/550	1,50/0,70
50-F82	✇✇	27,3	21,8	193	11160	2 x 18	46	22	42	500	1330/1030	820/550	1,50/0,70
56-F62	✇✇	30,0	24,0	174	15480	2 x 20	41	22	42	560	1360/1090	840/640	1,65/1,05
56-F82	✇✇	35,4	28,3	232	15120	2 x 20	55	22	42	560	1360/1090	840/640	1,65/1,05
40-F43	✇✇✇	12,6	10,0	65	9420	2 x 16	16	10	35	400	1350/1050	320/230	0,66/0,38
40-F63	✇✇✇	16,5	13,2	98	8940	2 x 16	25	15	35	400	1350/1050	320/230	0,66/0,38
45-F43	✇✇✇	18,0	14,4	87	13635	2 x 18	22	15	35	450	1330/970	640/430	1,10/0,70
45-F63	✇✇✇	23,0	18,4	130	12825	2 x 18	32	22	42	450	1330/970	640/430	1,10/0,70
50-F63	✇✇✇	34,2	27,3	217	17010	2 x 21	52	22	42	500	1330/1030	820/550	1,50/0,70
50-F83	✇✇✇	41,0	32,8	289	16740	2 x 21	70	22	42	500	1330/1030	820/550	1,50/0,70
56-F63	✇✇✇	45,0	36,0	260	23220	2 x 23	62	22	54	560	1360/1090	840/640	1,65/1,05
56-F83	✇✇✇	53,1	42,4	347	22680	2 x 23	83	2x22	2x42	560	1360/1090	840/640	1,65/1,05
40-F44	✇✇✇✇	16,8	13,4	87	12560	2 x 19	22	15	35	400	1350/1050	320/230	0,66/0,38
40-F64	✇✇✇✇	22,0	17,6	130	11920	2 x 19	33	22	35	400	1350/1050	320/230	0,66/0,38
45-F44	✇✇✇✇	24,0	19,2	116	18180	2 x 21	29	15	42	450	1330/970	640/430	1,10/0,70
45-F64	✇✇✇✇	30,7	24,5	174	17100	2 x 21	42	22	42	450	1330/970	640/430	1,10/0,70
50-F64	✇✇✇✇	45,5	36,4	290	22680	2 x 24	70	28	54	500	1330/1030	820/550	1,50/0,70
50-F84	✇✇✇✇	54,7	43,7	386	22320	2 x 24	93	2x22	2x42	500	1330/1030	820/550	1,50/0,70
56-F64	✇✇✇✇	60,0	48,0	347	30960	2 x 26	82	28	54	560	1360/1090	840/640	1,65/1,05
56-F84	✇✇✇✇	70,8	56,6	463	30240	2 x 26	110	2x22	2x42	560	1360/1090	840/640	1,65/1,05

Q_V chart (EN328, R404A) DZB-F 7 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity

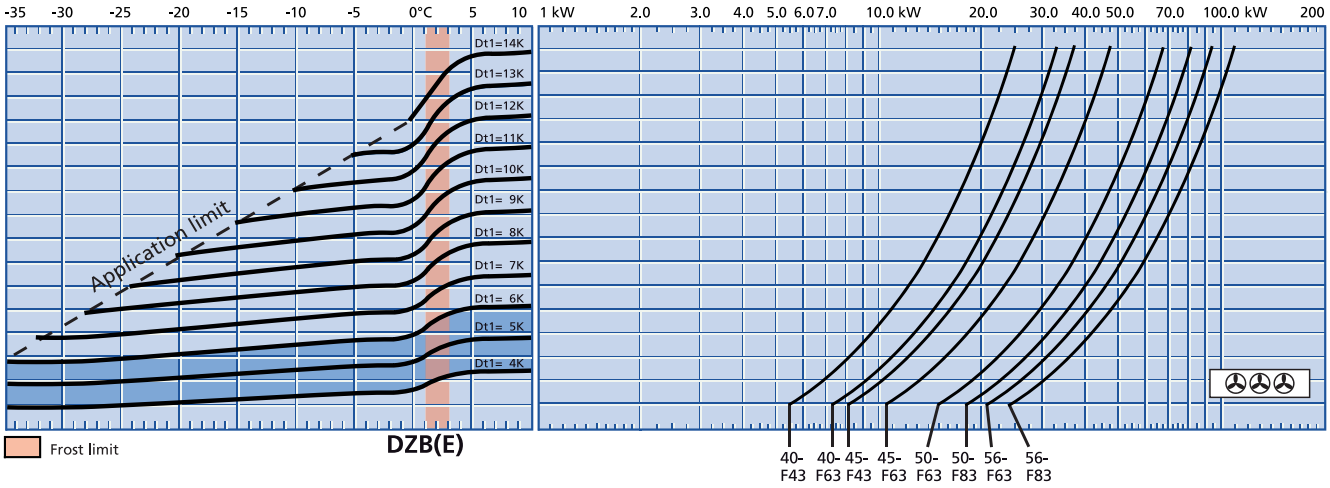


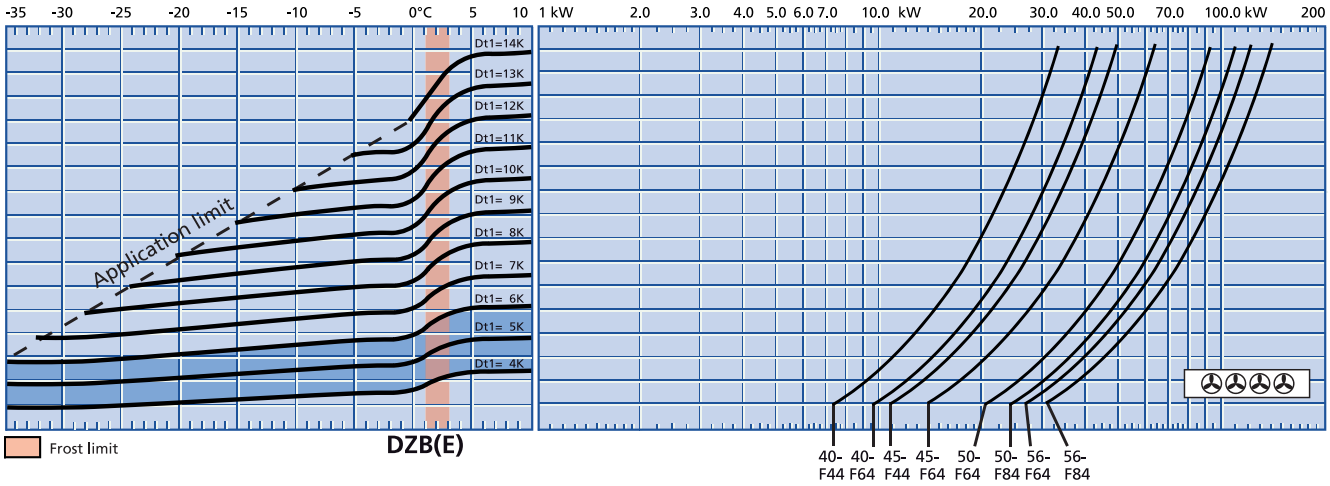


Q_V chart (EN328, R404A) DZB-F 7 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity





Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 **[°C]** = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference = $t_{L1} - t_0$ (°C)

DT1 = 4 K bis 6 K
with electronic expansion valve

Example selection:
For example and explanation, see the information section on p. 136.

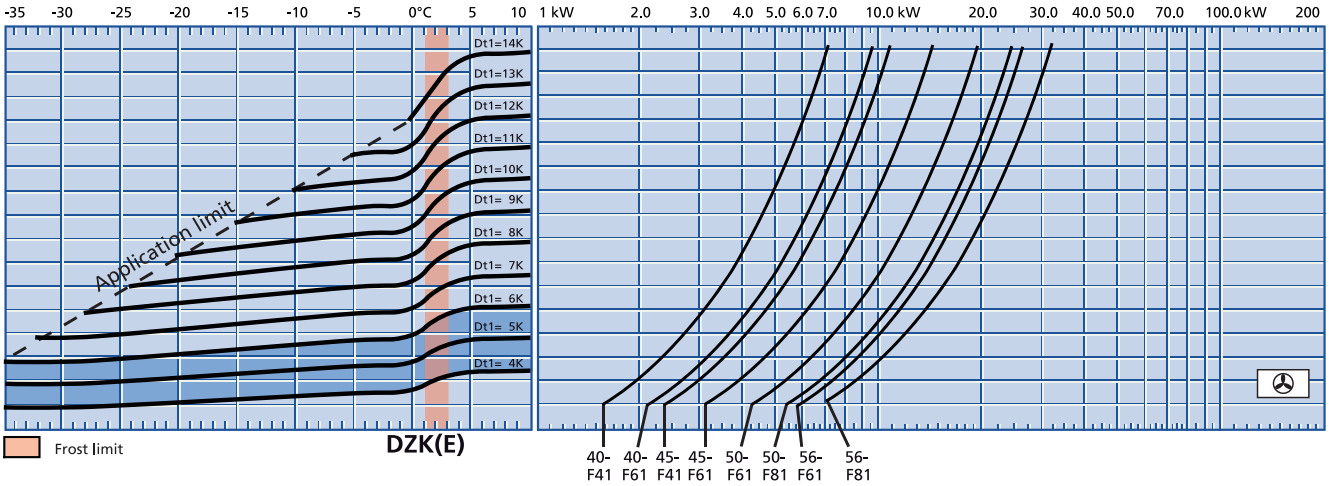
Technical data (R404A) DZK-F 10 mm

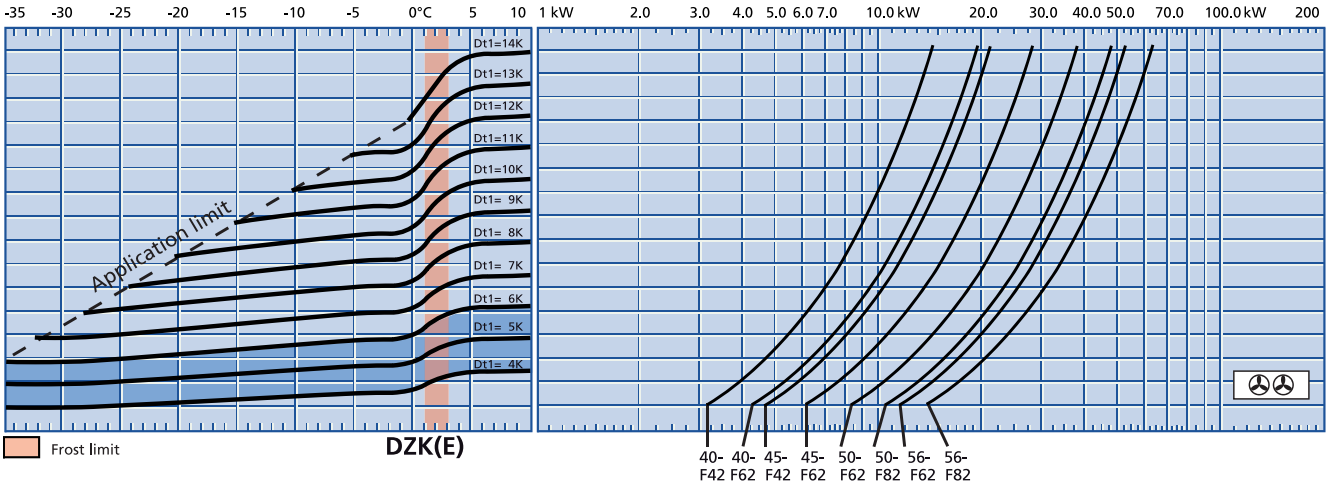
Model		Rating Q_0 at 50 Hz t_{t1} ±0 °C DT1 = 8K	Rating Q_0 at 50 Hz t_{t1} -18 °C DT1 = 7K	Surface	Airflow	Air throw	Tube volume	Connections Inlet	Connections Outlet	Blade	Per fan 400 ± 10% V-3~ 50Hz (operating values at 50 Hz)		
DZK-F(E)		kW	kW	m²	m³/h	m	dm³	Ø mm	Ø mm	Ø mm	min⁻¹	W	A
40-F41	✇	3,6	2,9	16	3330	2 x 11	5	10	28	400	1350/1050	320/230	0,66/0,38
40-F61	✇	4,9	3,9	23	3240	2 x 11	8	10	28	400	1350/1050	320/230	0,66/0,38
45-F41	✇	5,2	4,1	21	5040	2 x 13	7	10	28	450	1330/970	640/430	1,10/0,70
45-F61	✇	7,1	5,7	31	4905	2 x 13	11	10	28	450	1330/970	640/430	1,10/0,70
50-F61	✇	9,6	7,7	52	5850	2 x 16	17	10	35	500	1330/1030	820/550	1,50/0,70
50-F81	✇	12,0	9,6	69	5760	2 x 16	23	15	35	500	1330/1030	820/550	1,50/0,70
56-F61	✇	12,8	10,2	62	7965	2 x 18	21	15	35	560	1360/1090	840/640	1,65/1,05
56-F81	✇	15,4	12,3	83	7740	2 x 18	28	15	35	560	1360/1090	840/640	1,65/1,05
40-F42	✇✇	7,2	5,7	31	6660	2 x 14	11	10	28	400	1350/1050	320/230	0,66/0,38
40-F62	✇✇	9,8	7,8	47	6480	2 x 14	16	10	35	400	1350/1050	320/230	0,66/0,38
45-F42	✇✇	10,3	8,2	42	10080	2 x 16	14	10	35	450	1330/970	640/430	1,10/0,70
45-F62	✇✇	14,1	11,3	62	9810	2 x 16	21	15	35	450	1330/970	640/430	1,10/0,70
50-F62	✇✇	19,2	15,3	104	11700	2 x 19	35	22	35	500	1330/1030	820/550	1,50/0,70
50-F82	✇✇	23,9	19,1	139	11520	2 x 19	46	22	42	500	1330/1030	820/550	1,50/0,70
56-F62	✇✇	25,5	20,4	125	15930	2 x 21	41	22	42	560	1360/1090	840/640	1,65/1,05
56-F82	✇✇	30,8	24,6	167	15480	2 x 21	55	22	42	560	1360/1090	840/640	1,65/1,05
40-F43	✇✇✇	10,8	8,6	47	9990	2 x 17	16	10	35	400	1350/1050	320/230	0,66/0,38
40-F63	✇✇✇	14,7	11,7	70	9720	2 x 17	25	15	35	400	1350/1050	320/230	0,66/0,38
45-F43	✇✇✇	15,5	12,3	62	15120	2 x 19	22	15	35	450	1330/970	640/430	1,10/0,70
45-F63	✇✇✇	21,2	17,0	94	14715	2 x 19	32	22	42	450	1330/970	640/430	1,10/0,70
50-F63	✇✇✇	28,8	23,0	156	17550	2 x 22	52	22	42	500	1330/1030	820/550	1,50/0,70
50-F83	✇✇✇	35,9	28,7	208	17280	2 x 22	70	22	42	500	1330/1030	820/550	1,50/0,70
56-F63	✇✇✇	38,3	30,6	187	23895	2 x 24	62	22	54	560	1360/1090	840/640	1,65/1,05
56-F83	✇✇✇	46,2	36,9	250	23220	2 x 24	83	2x22	2x42	560	1360/1090	840/640	1,65/1,05
40-F44	✇✇✇✇	14,4	11,5	62	13320	2 x 20	22	15	35	400	1350/1050	320/230	0,66/0,38
40-F64	✇✇✇✇	19,6	15,7	94	12960	2 x 20	33	22	35	400	1350/1050	320/230	0,66/0,38
45-F44	✇✇✇✇	20,6	16,5	83	20160	2 x 22	29	15	42	450	1330/970	640/430	1,10/0,70
45-F64	✇✇✇✇	28,3	22,6	125	19620	2 x 22	42	22	42	450	1330/970	640/430	1,10/0,70
50-F64	✇✇✇✇	38,4	30,6	208	23400	2 x 25	70	28	54	500	1330/1030	820/550	1,50/0,70
50-F84	✇✇✇✇	47,8	38,2	278	23040	2 x 25	93	2x22	2x42	500	1330/1030	820/550	1,50/0,70
56-F64	✇✇✇✇	51,0	40,8	250	31860	2 x 27	82	28	54	560	1360/1090	840/640	1,65/1,05
56-F84	✇✇✇✇	61,6	49,2	334	30960	2 x 27	110	2x22	2x42	560	1360/1090	840/640	1,65/1,05

Q_V chart (EN328, R404A) DZK-F 10 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity

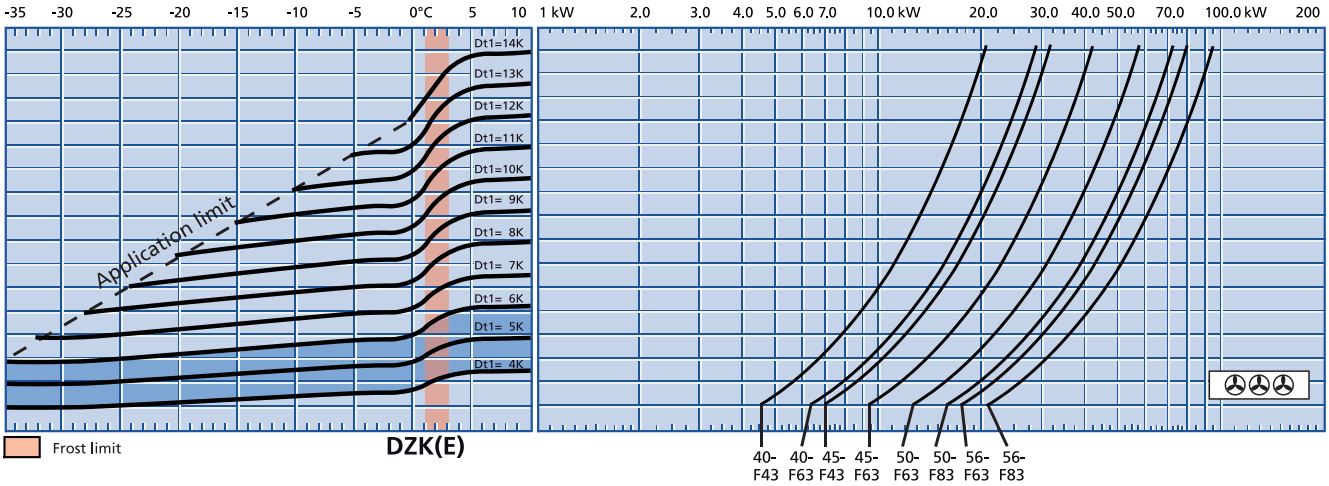


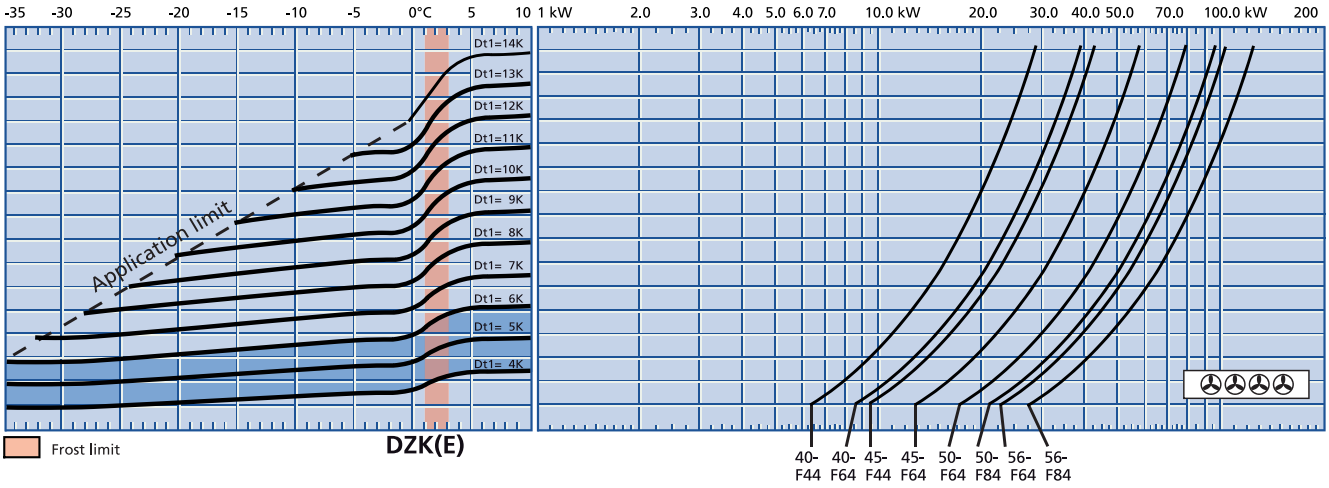


Q_V chart (EN328, R404A) DZK-F 10 mm

t_{L1} [°C] Air inlet temperature

Q_0 [kW] Cooling capacity



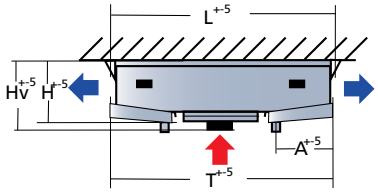


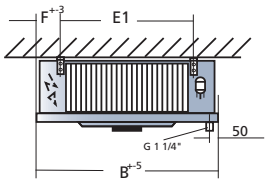
Q_0 = Cooling capacity
t_{L1} = Air inlet temperature
t_0 [°C] = Evaporating temperature (coil outlet)
DT1 [K] = Temperature difference $= t_{L1} - t_0$ (°C)

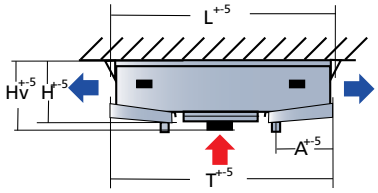
DT1 = 4 K bis 6 K
with electronic expansion valve

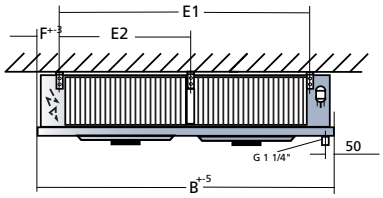
Example selection:
For example and explanation, see the information section on p. 136.

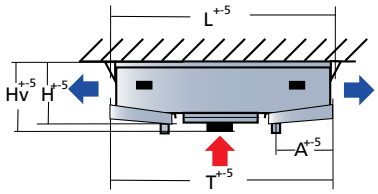
Dimensional drawings

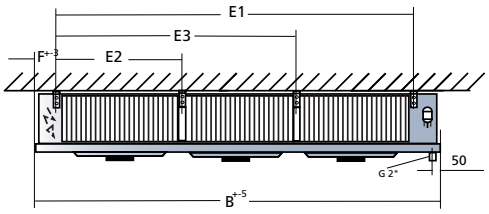


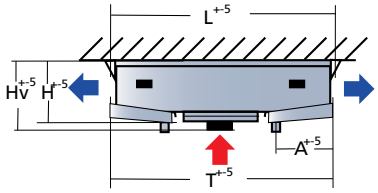


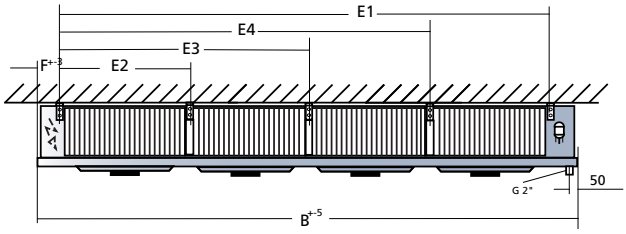












Sound power level L_{WA} [dB(A)]

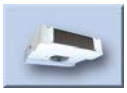
Model	✇	✇ ✇	✇ ✇ ✇	✇ ✇ ✇ ✇
DZ 40	75/69	78/72	80/74	81/75
DZ 45	79/74	82/77	84/79	85/80
DZ 50	80/73	83/76	85/78	86/79
DZ 56	81/76	84/79	86/81	87/82

Dimensional drawings, electric defrost, weights

	Dimensions [mm]											Electric defrost			DZ-F, DZ-G Net weight			DZ-N Net weight		
Size	H	Hv	B	T	L	E_1	E_2	E_3	E_4	F	A	Coil	Tray	Total	DZA	DZB	DZK	DZA	DZB	DZK
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kW	kW	kW/*	kg	kg	kg	kg	kg	kg
40-F41	419	433	1024	1513	1536	650	-	-	-	187	331	2,46	1,38	3,84/1	87	83	81	92	87	85
40-F61	419	433	1024	1513	1536	650	-	-	-	187	331	2,46	1,38	3,84/1	98	91	88	103	95	93
45-F41	419	439	1224	1513	1536	850	-	-	-	187	331	3,06	1,72	4,78/1	101	95	93	106	100	98
45-F61	419	439	1224	1513	1536	850	-	-	-	187	331	3,06	1,76	4,82/1	116	107	103	122	112	108
50-F61	522	564	1624	1902	1926	1050	-	-	-	287	431	5,73	2,29	8,02/2	190	174	169	200	183	177
50-F81	522	564	1624	1902	1926	1050	-	-	-	287	431	7,64	2,29	9,93/2	218	196	187	229	205	196
56-F61	522	541	1824	1902	1926	1250	-	-	-	287	431	6,87	2,60	9,47/2	215	196	189	226	205	198
56-F81	522	541	1824	1902	1926	1250	-	-	-	287	431	9,16	2,60	11,76/2	244	218	207	256	229	217
40-F42	419	433	1624	1513	1536	1250	600	-	-	187	331	4,28	2,29	6,57/1	133	123	116	140	130	122
40-F62	419	433	1624	1513	1536	1250	600	-	-	187	331	4,28	2,29	6,57/1	153	138	134	160	145	140
45-F42	419	439	2024	1513	1536	1650	800	-	-	187	331	5,44	2,87	8,31/1	162	150	146	170	157	153
45-F62	419	439	2024	1513	1536	1650	800	-	-	187	331	5,44	2,87	8,31/1	191	172	165	200	181	174
50-F62	522	564	2624	1902	1926	2050	1000	-	-	287	431	10,32	3,75	14,07/2	317	285	274	333	300	288
50-F82	522	564	2624	1902	1926	2050	1000	-	-	287	431	13,76	3,75	17,51/2	366	321	303	384	337	319
56-F62	522	541	3024	1902	1926	2450	1200	-	-	287	431	12,00	4,33	16,33/2	373	335	322	392	352	338
56-F82	522	541	3024	1902	1926	2450	1200	-	-	287	431	16,00	4,33	20,33/2	434	381	360	456	400	378
40-F43	419	433	2224	1513	1536	1850	600	1200	-	187	324	6,36	3,18	9,54/1	201	187	183	212	196	192
40-F63	419	433	2224	1513	1536	1850	600	1200	-	187	324	6,36	3,18	9,54/1	233	211	204	245	222	215
45-F43	419	439	2824	1513	1536	2450	800	1600	-	187	324	7,80	4,00	11,8/1	255	237	231	268	248	242
45-F63	419	439	2824	1513	1536	2450	800	1600	-	187	324	7,80	4,00	11,8/1	297	269	259	311	282	272
50-F63	522	564	3624	1902	1926	3050	1000	2000	-	287	424	14,52	5,20	19,72/2	440	394	377	462	413	396
50-F83	522	564	3624	1902	1926	3050	1000	2000	-	287	424	19,36	5,20	24,56/2	518	453	426	544	476	448
56-F63	522	541	4224	1902	1926	3650	1200	2400	-	287	424	17,22	6,36	23,58/2	523	466	446	550	489	468
56-F83	522	541	4224	1902	1926	3650	1200	2400	-	287	424	22,96	6,36	29,32/2	614	534	502	644	561	528
40-F44	419	433	2824	1513	1536	2450	600	1200	1800	187	324	7,80	4,00	11,8/1	268	249	243	281	261	255
40-F64	419	433	2824	1513	1536	2450	600	1200	1800	187	324	7,80	4,00	11,8/1	310	282	272	326	296	286
45-F44	419	439	3624	1513	1536	3250	800	1600	2400	187	324	10,40	5,20	15,6/1	325	300	292	341	315	307
45-F64	419	439	3624	1513	1536	3250	800	1600	2400	187	324	10,40	5,20	15,6/1	383	345	332	402	363	349
50-F64	522	564	4624	1902	1926	4050	1000	2000	3000	287	424	20,22	6,88	27,1/2	579	515	493	608	541	517
50-F84	522	564	4624	1902	1926	4050	1000	2000	3000	287	424	26,96	6,88	33,84/2	677	592	556	710	621	584
56-F64	522	541	5424	1902	1926	4850	1200	2400	3600	287	424	23,40	8,00	31,4/3	685	608	566	719	638	585
56-F84	522	541	5424	1902	1926	4850	1200	2400	3600	287	424	31,20	8,00	39,2/3	799	692	650	839	727	683

* Electric defrost divided in /n circuits

The dimensions are only valid for standard model design!
Note the differences in dimension for versions and accessories.



Versions

Motor versions
• **V1.10**

Internal 3-phase fans
400 ± 10% V-3~, 50Hz Δ/Y

Special features:
• Internal, hinge-down fan
• Fan completely wired to connection box
• Quiet design also available

The cooling capacity data, technical data and dimensions correspond with those for the standard Küba DZ.

Water/brine circulation

• **V2...**
Tube circuitry and connections for water and brine are available.

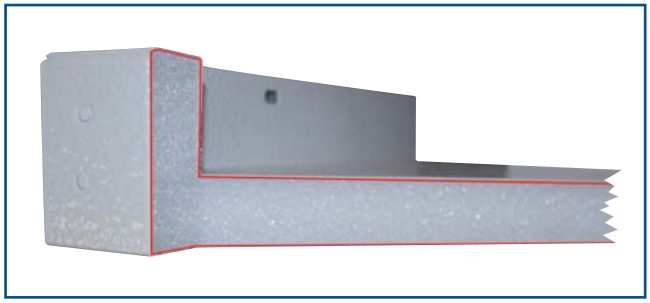
Alternative casing versions

Double insulated drip tray
• **V3.09**

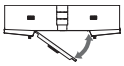
The double insulated drip tray has 25 mm of insulation. The insulation prevents condensation water from building up on the bottom side of the tray and reduces the transfer of defrost heat into the Cold Room.

This changes the following dimensions:

Width B:	+60 mm
Hight H:	+30 mm
Depth T:	+60 mm



Hinged fans
• **V3.10**



To make the devices easy to clean, the fans are mounted with stainless steel hinges.

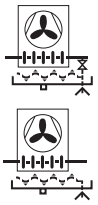
Defrosting versions

All Küba Air Coolers are available with electric defrost. See nomenclature, p. 114

Hot gas defrost in the drip tray
• Hot gas connection on both sides
• V4.01 Copper
• V4.02 Stainless steel

Hot gas in the heat exchanger
• V6.05 Hot gas connection on the heat exchanger

Hot gas in the heat exchanger and in the drip tray, copper design Copper with/without check valve
• Hot gas connection on both sides
• V6.07 with check valve
• V6.08 without check valve



Further information regarding corrosion protection can be found on pages 132 to 135

Protection against corrosion

Stainless steel casing
• **V3.12**

For protection in aggressive environments, e.g. in smokehouses and curing areas, all casing components are stainless steel.

• **V6.01**

Heat exchanger:

Tubing:	Cu
Fin:	Al „goldlack“ coating
End plates:	Al protective coating

Casing: Sendzimir galvanised steel, protective coating on both sides

Versions

- **V6.02**

Heat exchanger:
Tubing: Stainless steel
Fins: Al „goldlack“ coating
End plates: Stainless steel

Casing: Sendzimir galvanised steel, protective coating on both sides
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **V6.03**

Heat exchanger:
Tubing: Stainless steel
Fins: Al
End plates: Al

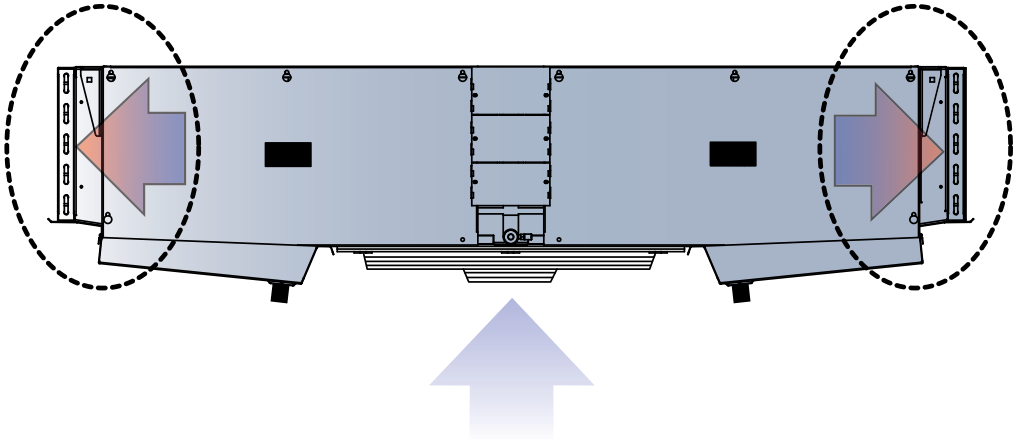
Casing: Sendzimir galvanised steel, protective coating on one side
Refrigerant distributor: Standard Venturi
Stainless steel CAL® distributor on request

- **V6.04**

Heat exchanger:
Tubing: Cu
Fins: Al „goldlack“ coating
End plates: Al

Casing: Sendzimir galvanised steel, protective coating on one side

Accessories



Electric radiator DZHR

For Air Coolers with blow-through fans, for on site assembly.
Suitable for air conditioning or heating in winter. For optimum heat transfer the heaters are mounted in Cu tube sleeves.

- For Air Coolers with blow-through fans, on site assembly.

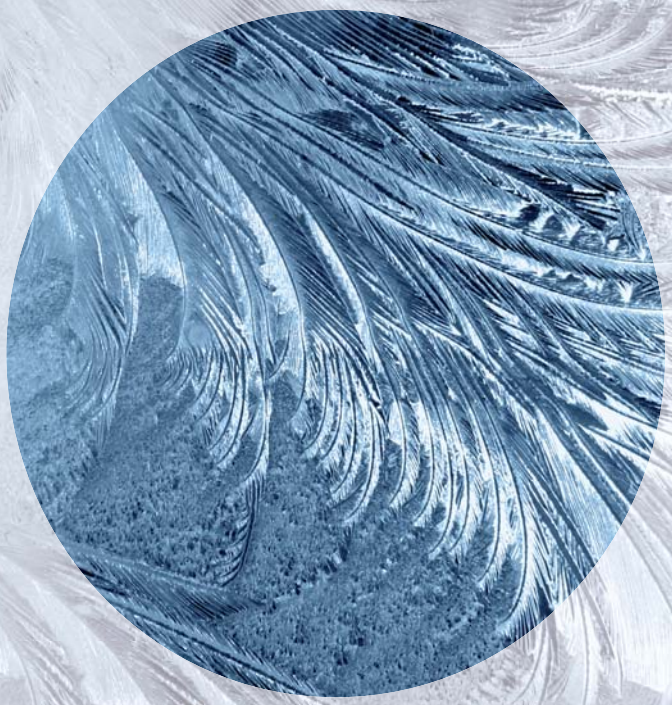
Only for use with running air cooler fans so that the ceiling of the cold storage areas does not overheat.

Construction:
- 230 ± 10% V-1~ oder 400 ± 10% V-3~ -Y
- Heaters with CrNi steel sleeve
- Vapour-tight connections
- Connector cable 1.5 mm² x 1000 mm
- Casing: Sendzimir galvanised steel
- Fins: Al
- Tube sleeves: Cu
- Completely powder-coated RAL 9018

Selection table

For aircoolers	Rating kW	Number to order
DZ 40-1	2,88	2 DZHR 40-1
DZ 45-1	3,69	2 DZHR 45-1
DZ 50-1	7,65	2 DZHR 50-1
DZ 56-1	9,20	2 DZHR 56-1
DZ 40-2	5,52	2 DZHR 40-2
DZ 45-2	7,26	2 DZHR 45-2
DZ 50-2	15,90	2 DZHR 50-2
DZ 56-2	18,80	2 DZHR 56-2
DZ 40-3	8,15	2 DZHR 40-3
DZ 45-3	11,25	2 DZHR 45-3
DZ 50-3	22,50	2 DZHR 50-3
DZ 56-3	27,20	2 DZHR 56-3
DZ 40-4	11,25	2 DZHR 40-4
DZ 45-4	14,50	2 DZHR 45-4
DZ 50-4	31,80	2 DZHR 50-4
DZ 56-4	37,50	2 DZHR 56-4

Further information



All Küba Air Coolers have been developed and manufactured in accordance with the highest quality standards and optimised for the respective refrigeration task. To select the right Küba high performance air cooler and to ensure optimum operation, on the following pages we present information that our customers have often requested.

Küba Line Air Coolers are available in a wide variety of designs, each perfect for a particular refrigeration application. The **overview of the different design versions on page 130** shows the possibilities offered by the respective product lines.

Background knowledge for a practical **comparison of sound output specification for Air Coolers can be found on page 131.**

The Küba Blue Line offers the right products for complex refrigeration applications. For this reason, **starting on page 132 we provide information regarding corrosion protection.** The most significant cooling tasks and the recommended corrosion protection for each are discussed there.

To quickly and easily determine the capacity of Küba Air Coolers in a variety of application conditions, the product sections include Q_V charts. **The Q_V charts are explained on page 136.**

In addition to the air cooler, the expansion valve plays a particularly important role in achieving optimum operating conditions in the overall refrigeration plant. Information regarding the correct **setting of the expansion valve** and the selection of the **right design can be found starting on page 137.**

To achieve optimum air cooler function **page 140 contains assembly instructions** for suction lines, condensation lines, traps and clearances.

Explanations of concepts and abbreviations are included in the **glossary starting on page 141.**

Version overview

Product lines	DE.D	SG.C	SG.I	SF	DZ
Cooling media					
HFC	✓	✓	✓	✓	✓
NH3 pump	–	✓	✓	✓	✓
NH_3 DX	–	✓	✓	✓	✓
Brine / water	✓	✓	✓	✓	✓
CO_2 pump	–	✓	✓	✓	✓
CO_2 DX	✓	✓	✓	✓	✓
Motor versions					
V1.02: Alternating current 230 V-1Ph	•	•/✓	✓	–	✓
V1.03: 3-phase 400 V-3Ph 1 speed	–	✓	•	–	–
V1.04: Delta/star 400V-3Ph	–	✓	✓	•	•
V1...: Quiet design	✓	✓	✓	–	✓
V1.07: Fans with fan guards / without air ducts	•	✓	✓	•	•
V1.08: Protection class IP66	–	✓	✓	–	✓
V1.09: 60 Hz 400V-3Ph	–	✓	✓	–	✓
V1.11: Workroom design (internal motor) / quiet	–	–	–	–	✓
V1.13: Ex-design (ATEX) 400V-3Ph	–	–/✓	✓	–	–
V1.17/V1.21: Dahlander switching 60 Hz 400V-3Ph	–	–/✓	✓	–	–
V1.41: Special voltage and UI design	–	✓	✓	–	✓
V1.60: More powerful fans	–	–	✓	✓	–
Water / brine circulation					
V2.05: Connections for water and brine circulation Large number of circuits – small pressure drop	✓	✓	–	–	–
V2.06: Connections for water and brine circulation Small number of circuits – large pressure drop	✓	✓	–	–	–
V2...: Tube circuitry and connections for water and brine	–	–	✓	✓	✓
Casing versions					
V3.09: Double insulated drip tray	✓	✓	✓	–	✓
V3.10: Hinged fans	•	✓	✓	✓	✓
V3.11: Hinge-down drip tray	•	✓	•	•	•
V3.12: Stainless steel casing	✓	✓	✓	✓	✓
Defrost versions					
V4.01: Hot gas coil in the drip tray, Cu	–	✓	✓	✓	✓
V4.02: Hot gas coil in the drip tray, stainless steel	–	✓	✓	✓	✓
V4.06: Electrically heated drip tray	✓	✓	✓	✓	✓
V6.05: Hot gas circuitry for coolers without check valve	–	✓	✓	✓	✓
V6.07: Hot gas connection in coils, hot gas coil in drip tray, with check valve	–	✓	✓	–	✓
V6.08: Hot gas connection in coils, hot gas coil in drip tray, no check valve	–	✓	✓	✓	✓
Corrosion prevention					
V3.12: Stainless steel casing	✓	✓	✓	✓	✓
V6.01: Tubes: Cu, Fins: „goldlack" End plates: aluminium: protective coating	✓	✓	✓	✓	✓
V6.02: Tubes: ED, Fins: „goldlack", End plates: ED, Casing: Al or galvanised or coated steel	✓	✓	✓	✓	✓
V6.03: Tubes: ED, Fins: Al, End plates: Al, Casing: Al, Standard powder-coated or galvanised steel	✓	✓	✓	✓	✓
V6.04: Tubes: Cu, Fins: „goldlack", casing coated	✓	✓	✓	✓	✓

✓ = available
– = not available
• = standard

–/✓ = partially available
•/✓ = available as standard or as alternative version

Sound specifications

Introduction

In the technical design of Air Coolers and condensers, capacity and sound output are defined parameters that must be specified. With regard to sound output specifications in the international market there are a variety of calculation methods. Different sound output specifications have significance for refrigeration contractors, designers and planners. For heat exchangers and condensers, compliance with specific immission values (e.g. noise level, workplace safety legislation, etc.), is best calculated using sound power use in the form of acoustic pressure Lp(A). However, for Air Coolers, information regarding sound power $L_{W(A)}$ is most suitable.

Acoustic pressure L_p

Pressure = force / surface [N/m²]
Alternating pressure generated by acoustic oscillation in the medium (e.g. air)

- **Advantage:**

Measurement can be directly determined
Thermal analogy: temperature measurement

- **Disadvantages:**
  Dependent on environmental influences such as: installation location, environment
  Dependent on distance to the sound source and reference surface used

Acoustic power L_W

is the sound energy radiated per time unit in [W] = [Nm/s]

- Advantages:
  Independent of environmental influences, of distance to the sound source or on the reference surface used
- Disadvantage:
  Cannot be measured directly

Sound intensity and A-evaluation

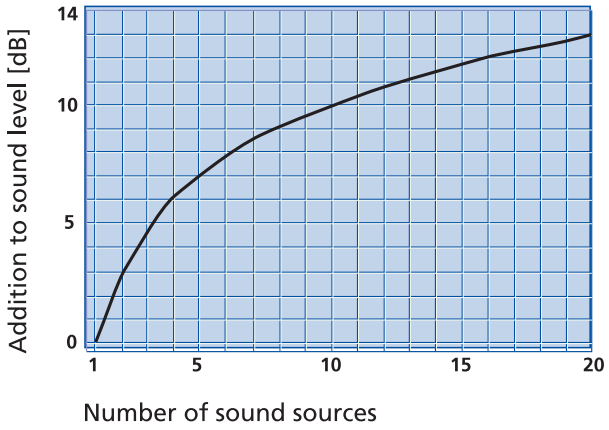
The human ear can perceive sound at frequencies between approx. 15 and 20,000 Hertz. Perception, or sensitivity to sound, depends strongly on the respective frequency. Very high and low tones are less often experienced as less loud than those in the mid-frequency range from about 1000 to 5000 Hertz. For this reason, evaluation filters in accordance with EN 61 672-1 are used. In audio technology and the environmental sector, the A-evaluation is most significant because it has similar frequency behaviour as the human ear for certain sound intensities.

Sound output specifications for Air Coolers

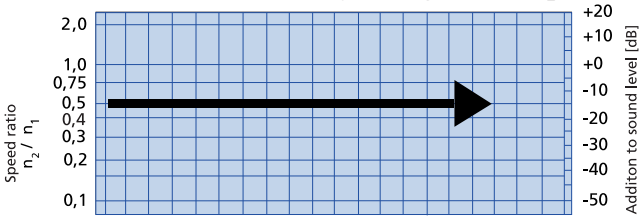
Due to the reflection in the cold storage area, the sound power $L_{W(A)}$ should always be used for a technical comparison between Air Coolers. In this case only sound power offers information that can be compared because it does not depend on the distance to the sound source, the installation location or the surroundings.

Sound power

Addition of sound sources at the same level



Correction of sound level by change of fan speed



Protection against corrosion

Corrosion:

According to DIN 50900 it is a reaction of a metallic substance with its environment.
- Almost always electrochemical
- An electrolyte is the cause for this type of material destruction

How does an electrolyte form:

If the air in the environment contains salts, acids or alkali, together with condensation water these substances form an electrolyte, i.e. a change of state occurs between two substances in which one dissolves or is at least destroyed.

In bakeries as well as in sausage production, spice mixtures and preservatives are being ground finer and finer so that the mixture is as homogenous as possible. In salt curing, cutter processes and processes where intestines are used, salts also enter the surrounding air. These small particles (harmful substances) are deposited on the surfaces of the coolers and damage the material.

The stricter hygiene regulations within the EU require the use of harsher cleaning and disinfectant agents in both the alkali and the acid range. If they are not properly neutralised, they are another cause of material damage.

For these applications we offer special corrosion protection designs that protect against such aggressive environments.

The degree of corrosion depends on the amount of moisture on the surface of the heat exchanger. The following specifications are recommendations and the planner and refrigeration contractor should rely on their own experience as well.

When using cleaning and disinfection agents pay attention to their compatibility with epoxy-based coatings, aluminium and copper (a variety of agents are not suitable in these cases). The protective coating and the „goldlack“ coating on the fins react to sodium hydroxide, for example.

Maintenance and service

In general, Küba Air Coolers do not require maintenance. In accordance with the hygiene regulations for the given application, the forced convection air cooler must be cleaned at regular intervals.

The degree of related contamination affects the effectiveness of the fan-air cooler. As a result, regular cleaning with cleaners compatible with the materials in the air cooler is required. Only the cleaners compatible with the materials in the cooler may be used, taking the manufacturer‘s instructions for application into account (e.g. mixture ratio, duration of exposure, finishing treatments).

When using steam or high-pressure cleaning, do not spray the electrical connection areas directly.

Before undertaking any maintenance or cleaning work, ensure that the electrical connections for the cooler are all disconnected from the mains and cannot be switched back on.

Protection against corrosion

When using cleaning and disinfection agents, please pay attention to their compatibility with the materials used in the product and observe the specifications given in the manufacturer's safety data sheets regarding their cleaning and disinfection agents.

Short overview

Slightly aggressive air in the environment:	Cold storage areas for fruits and tropical fruits
	Cold storage areas for pharmaceutical products
Very aggressive air in the environment:	Cold storage areas for smoked meats and fish,
	Salt curing rooms
	Malt houses
	Industrial facilities: steel mills, foundries
	Swimming pools
	Cold storage areas for fresh salads and marinades
	Cheese ripening rooms

Application	Air in the environment	Protection class	Construction				Note
			Heat exchanger			Casing	
			Tube	Fin	End plate		
Regular cleaning and disinfection							Important: rinse well and neutralise
➢ **Type of cleaning or disinfection**	e.g. foam or manual process, etc.						
➢ **The concentration must be known**	cleaning agents that contain chlorine, acids or alkali	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Sometimes VA casing required
Baked goods							
➢ **Deep-freeze storage area**	no exposure	none	Cu	Al	Al	Al / galvanised steel	Fin spacing at least 7 mm
➢ **Blast freezing rooms**	no exposure	none	Cu	Al	Al	Al / Steel	Fin spacing at least 7 mm
➢ **Fermentation interrupter / machines**	organic compositions dust, vapours including baking ingredients	V6.03	VA	Al	Al	Al / galvanised steel, coated (one side)	Fans with speed controllers
Beverages							
➢ **Fermenting cellar / wine**	low CO_2 content	V6.03	VA	Al	Al	Al / galvanised steel, coated (one side)	
	higher CO_2 content or sulphur or chlorine	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Fruit juice filling systems**	acids, e.g. lemon, wine or sulphuric acids	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Air speed Observe if people are present
➢ **Mineral water filling systems**	Aerosols	V6.01	Cu	Al „goldlack"	Al-sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Observe air speed if people are present
➢ **Malt houses**	Organic acids, aggressive dusts, high protein levels	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	

Protection against corrosion

Application	Air in the environment	Protection class	Construction				Note
			Heat exchanger			Casing	
			Tube	Fin	End plate		
Cheese							
➢ **Storage**	Low NH_3 content, low relative humidity	V6.01	Cu	Al „goldlack"	Al-sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	With very low exposure, normal standard design is possible
	Low NH_3 content, high relative humidity	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Ripening rooms**	High NH_3 content, high relative humidity	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Little air movement
Fruits / vegetables							
➢ **Citrus fruits**	High fruit acid content	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Low dehumidification at low DT1 / low airspeed during long-term storage
➢ **Other tropical fruits**		V6.01	Cu	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Bananas**	Corrosive vapours from banana peels	V6.03	VA	Al	Al	Al / galvanised steel, coated (one side)	Note high external pressure
➢ **Vegetables**		Standard	Cu	Al	Al	Al / galvanised steel	For optimum ventilation note stacking plans
Meat / sausage							
➢ **Deep-freeze storage area (packaged / unsealed goods)**	No exposure	Standard	Cu	Al	Al	Al / galvanised steel	Recommended accessories: Shut-Up® and Defrosting hood
➢ **Cold storage area for raw / fresh meats**	No exposure	Standard	Cu	Al	Al	Al / galvanised steel	
➢ **Rapid cooling for carcasses**	Organic compositions, cleaning agents	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	High air flow rate required
➢ **Smoked meat / sausage**	Organic acids, amines	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Salt curing rooms**	Salts, organic acids	V6.02+ V3.12	VA	Al „goldlack"	VA	VA	
➢ **Offal**	Organic acids, cleaning agents	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Central storage area							
➢ **Picking / distribution**	Dust, debris, etc.	Standard	Cu	Al	Al	Al / galvanised steel Al / galvanised steel	
		V6.04	Cu	Al „goldlack"	Al		
➢ **Frozen storage areas**	No exposure	Standard	Cu	Al	Al	Al / galvanised steel	Recommended accessories: Shut-Up® and Defrost hood
Marinades / ready-to-eat salads							
➢ **Occasional open storage**	Salts, acids, vinegar, preservatives	V6.01	Cu	Al „goldlack"	Al-sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Frequent open storage**		V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Dairy facilities							
➢ **Low percentage**	Vapours from lactic and butyric acids	V6.01	VA	Al „goldlack"	Al - sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	

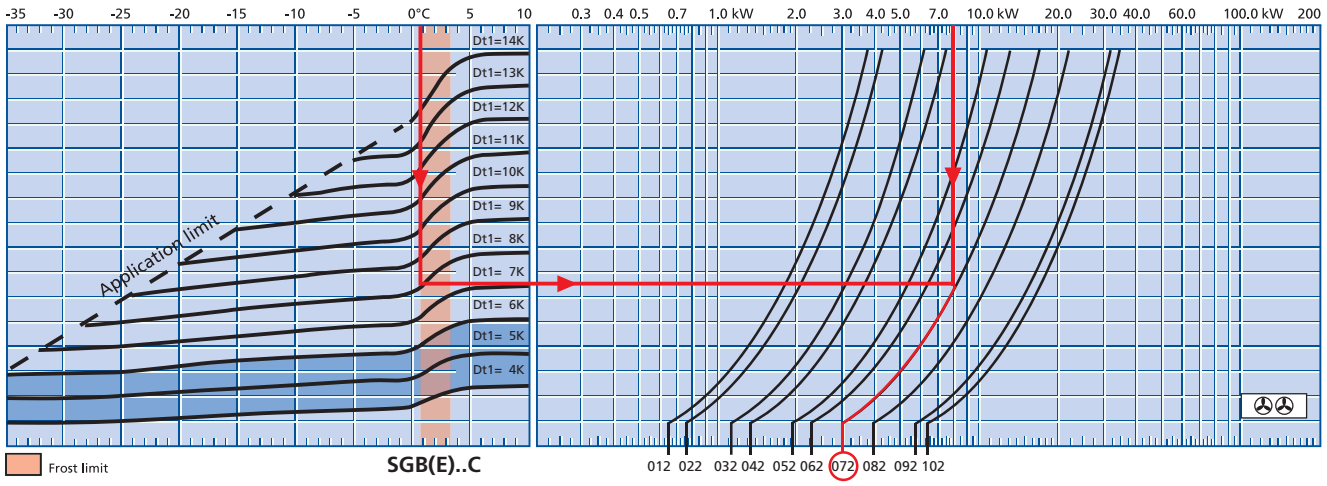
Protection against corrosion

Application	Air in the environment	Protection class	Construction				Note
			Heat exchanger			Casing	
			Tube	Fin	End plate		
➢ **High percentage**	Vapours from lactic and butyric acids	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Fish / seafood							
➢ **Preparation rooms**	Amines, salts	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Observe air speed if people are present
➢ **Storage rooms, including deep-freeze**		V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Recommended accessories: Shut-Up® and defrost hood
Coffee							
➢ **Roasters**	Organic acids	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Pastry shops							
➢ **Candy manufacturers**		V6.01	Cu	Al „goldlack"	Al-sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	Little air movement
➢ **Preparation of icing / frosting**		V6.01	Cu	Al „goldlack"	Al-sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Swimming pools							
➢ **Dehumidification**	Chlorine gas, muriatic acid, (cleaning agents)	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Kiln drying							
➢ **Hardwoods (e.g. oak, tropical woods)**	Organic acids (folic acid), cresylic acid, ammonium	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Softwoods (e.g. spruce, fir, pine)**	Low amounts: organic acids; resins	V6.03	VA	Al	Al	Al / galvanised steel, coated (one side)	
Industrial facilities							
➢ **Crane cabs in steel mills / foundries**	Aggressive gases (chlorine), sulphur dioxide, metallic dusts	V6.03	VA	Al	Al	Al / galvanised steel, coated (one side)	
Grains, animal feeds							
➢ **Storage rooms**	Dust, often moist	Standard	Cu	Al	Al	Al / galvanised steel, coated (one side)	
Sea air (no direct seawater)							
➢ **Cold rooms near the sea**	Air with slight salt content	V6.01	Cu	Al „goldlack"	Al-sl	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
➢ **Cold rooms near the sea**	Air with high salt content	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	
Cattle sheds / intensive animal husbandry							
➢ **Heat recovery**	NH_3 atmosphere, sulphur compositions, dusts	V6.02	VA	Al „goldlack"	VA	Al, protective coating (both sides) / galvanised steel, coated (both sides)	

Key

Al	=	Aluminium
Al „goldlack"	=	Aluminium epoxy resin coating, „goldlack" coating
Cu	=	Copper
VA	=	Stainless steel, depending on application V2A= 1.4301 or V4A= 1.4404

Explanation of Q_V charts (R404A)



For practical assistance during selection, we have created Q_V charts which also includes the catalogue comparison value for standard conditions 2 and 3 (incl. latent capacity). In accordance with EN 328, the performance specifications are based on the air inlet temperature t_{L1} at the air cooler and the difference DT1 between the air inlet temperature t_{L1} and the evaporating temperature t_0 at the coil outlet.

To obtain ratings close to practice values we multiplied the capacity measured for a dry surface by the Eurovent factors for latent capacity. In this way we also take the latent heat due to precipitation at the frost limit into consideration, given an air cooler surface that is ice-free or has very little frost cover.

All ratings are effective when relative humidity is between 85% and 95% and the higher humidity values correspond with low DT1 values. In our Q_V charts, the change in the k-value is factored in with t_{L1}.

The „humid“ capacity cannot be used to calculate how much the air is cooled.

$$\dot{V}_L = \frac{\dot{Q}_0 \text{ dry}}{\rho \times cpL \times DTL} \quad \text{where } DTL = t_{L1} - t_{L2}$$

Because the Q_V charts cannot consider all possible operating conditions, particularly when coolants are used, we recommend using our selection software Küba Select with its HELP program. Capacity measurements were performed with R507.

Application example:

- **Given: t_{L1} = 1 °C, DT1 = 8 K, Q_0 = 8 kW; for reasons of operational safety at least two fans;**
- **Appropriate product line: e.g. SGBE.C** (= SG *commercial* with fin spacing of 7 mm and electrical defrosting). Fin spacing of 7 mm or more is best for evaporating temperatures below -2 °C because the greater fin spacing achieves longer operating periods before defrosting again. During operation, this yields lower costs and better system availability.
- **Refrigerant: R404A**
- **To determine: model size**
- **Solution:** In the Q_V chart follow the DT1 = 8 K curve to the intersection with vertical lines for t_{L1} = +1 °C, then draw a horizontal line to the vertical line for Q_0 = 8 kW. The **air cooler model SGBE 072C** can be found underneath.

In general, the following applies: If the intersection is located between two model curves, the smaller cooler model is sufficient if a lower evaporating temperature is acceptable and the compressor can run for a longer period. However, this means higher operating costs. For this reason, Küba recommends choosing the larger air cooler in order to achieve higher evaporating temperatures which lead to lower operating costs because the compressor does not run for longer periods and the air cooler‘s service life is longer. A modification of DT1 to ΔDT1 = 1 K yields a change in capacity by approx 10% for DT1 = 10 K. Automatic defrosting (electric heaters, hot gas, cold gas) is recommended if the intersection DT1 / t_{L1} is below the frost limit.

Expansion valve

Selecting the right expansion valve design – which is the right one?

What are the differences between expansion valves with internal and with external pressure compensation?

Expansion valves with internal pressure compensation

The injection line connects the expansion valve to the evaporator input. The evaporation pressure at this point is p_O so that the pressure below the valve diaphragm is also p_O. In each of the components where the stream passes through, the pressure drops and the pressure p_O in the evaporator sinks in the direction of the flow. The pressure at the outlet is lower than at the inlet. In addition, the increase in superheat at the evaporator outlet (coil suction) corresponds exactly with the pressure loss in the evaporator. Because pressure is lost in every evaporator, however, the overheating for each expansion valve with internal pressure compensation would increase. The limit for a pressure drop in the evaporator in the acceptable range when the evaporating temperature is modified is approx. Δ_{t0} = 2K. In this range, expansion valves with internal pressure compensation are often used and the related loss in capacity is accepted. But beyond this range valves with external pressure compensation are most often used.

Which evaporators are associated with a greater pressure drop?

- Evaporators with multiple injection
- High performance evaporators because these often operate with high refrigerant speed in order to achieve good heat transfer values
- Evaporators with long refrigerant paths

In these situations, expansion valves with external pressure compensation are used.

Expansion valves with external pressure compensation

As the previous example shows, the superheat is regulated at the evaporator outlet (coil suction). For this reason, the evaporator pressure must be recorded at the evaporator outlet. To do this, a pressure compensation line is laid from the evaporator outlet (coil suction) to the expansion valve. Usually the sensor is mounted first, then the pressure compensation line (in the direction of the flow). In this expansion valve is a partition; below this partition, the evaporator inlet pressure is higher; above it, the pressure is lower. This difference corresponds exactly with the pressure drop in the evaporator. In this way, the expansion valve regulates the normal superheat, preventing the loss of capacity associated with superheat that is too great. The pressure drop in the evaporator does not affect the superheat if the valve has external pressure compensation. The expansion valve with external pressure compensation cannot change the pressure drop, but it can prevent unnecessary increases in overheating and a drop in cooling performance.

Setting the expansion valve

The optimum capacity of an air cooler can only be achieved if the expansion valve is adapted for the respective air cooler system. For this reason, the expansion valve setting should be checked for every air cooler.

We want to make this possible without too much effort required for assembly, so all forced convection Air Coolers that operate with refrigerant are equipped with a Schrader valve soldered into the suction line.

As described previously, we determine the cooling capacity of our Air Coolers in accordance with EN 328. The superheat values, Δt_{oh}, specified there are 0.5 to 0.7 times temperature difference DT1. This should also be the goal in actual operation; e.g. at a DT1 of 8 K, about 4.0 to 5.5 K. The lower the superheat, the better the air cooler capacity. However, each thermostatic expansion valve, together with a specific air cooler allows only a specified lowest amount of superheat. Below this amount, i.e. if the valve is open too far, the valve regulates the amount based on sudden changes (Hunting), which leads to a lower capacity for the air cooler. The fluctuations should not exceed 0.5 K.

The right superheat ratio

The optimum superheat Δt_{0h} during operation is 0.65 times (overheating ratio) the temperature difference Δt_1 between the air inlet temperature t_{L1} and the evaporating temperature t_0 at the air cooler's suction line (Fig. 1, page 138).
If the valve facilitates the rating at superheat Δt_{0h} 4 K, a minimum temperature difference of $\Delta t1$ ~ 6 K can be achieved at the cooler:

$$\Delta t_1 = \Delta t_{0h} / 0.65 = 4\ K / 0.65 = \sim 6\ K$$

Expansion valve

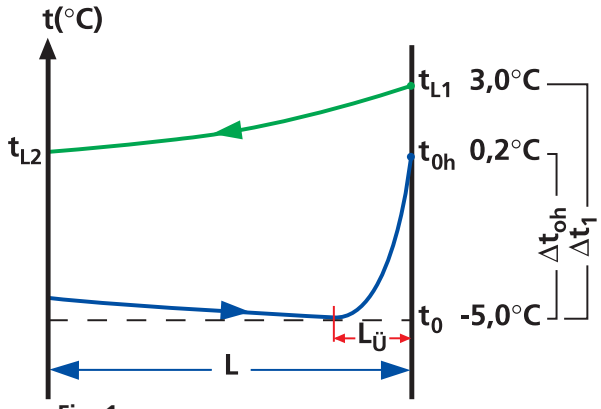


Fig. 1

t_{L1} = Air inlet temperature into the air cooler
t_{L2} = Air discharge temperature from the air cooler
t_{0h} = Overheating temperature at the outlet of the air cooler (suction)
t_0 = Evaporating temperature at the outlet of the air cooler (coil outlet)
L = Evaporating section length for the refrigerant
$L_Ü$ = Overheating section length ~10% of L

Overheating ratio =

$$\frac{\Delta t_{0h}}{\Delta t_1} = \frac{t_{0h} - t_0}{t_{L1} - t_0} = \frac{0,2 - (-5,0)}{3,0 - (-5,0)} = \frac{5,2}{8,0} = 0,65$$

Influence of superheat on evaporator capacity

If the overheating ratio deviates from the specifications according to EN 328, not only the cooling capacity of the air cooler is modified (Fig. 2) but if the difference is great, serious malfunctions can be expected. This will be discussed later. Based on our experience, in actual operation a refrigeration system still functions acceptably at an overheating ratio between 0.5 and 0.7, i.e. the loss in capacity still does not appreciably affect the system's function.

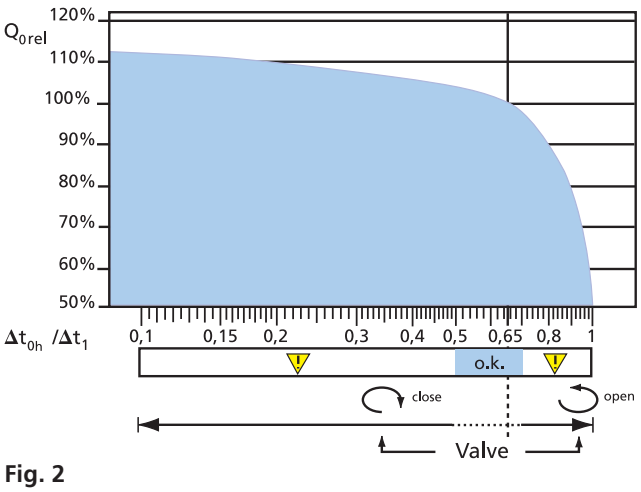


Fig. 2

Measurement of superheat

The air cooler must be completely ice and frost free and the designated ambient temperature achieved. On our forced convection Air Coolers pressure can be measured easily: a Schrader valve is soldered into the suction line in all standard models! Use a gauge in accordance with at least measuring class 1. The evaporating temperature t can be read directly on the gauge. If only one pressure scale (excess pressure!) is available, the vapour pressure table (absolute pressure!) provides more assistance. The temperature measurement is performed near the sensor on the expansion valve. To prevent measuring errors, the measuring device sensor should be insulated to a length of 10 x the tube diameter. If temperature is recorded for at least 15 minutes, the measuring accuracy is higher. The difference between the measured temperature and the evaporating temperature is the superheat setting of the valve during operation (Fig. 3).

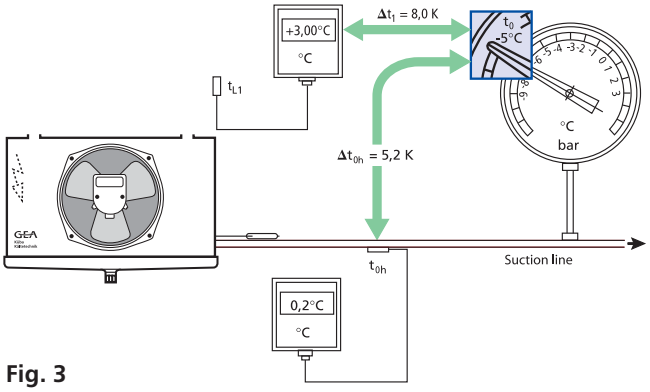


Fig. 3

Setting the expansion valve

If the superheat at the coil outlet deviates from the value Δt_1 x 0.65, the nominal capacity of the valve in not consistent with the air cooler at the operating point. To achieve better cooler performance, the valve must be adjusted. Observe the manufacturer's instructions. Always use small increments. After each adjustment of the valve, wait for stable function (often up to 30 minutes) and only then, if necessary, should it be turned further. If the refrigeration system is operated with a superheat ratio <0.65 at the coil outlet, i.e. with a valve that is opened too far, the regulation is based on sudden changes (Hunting). This also has a negative affect on the air cooler capacity. The fluctuations in superheat should not exceed ±0,5 K.

Expansion valve

Check or readjust the expansion valve according to the following instructions:

1. Unscrew the cap on the Schrader valve and connect the P_0-suction pressure gauge. This gauge should have the highest metering accuracy possible. Read the temperature of the refrigerant or use the refrigerant gauge to determine the corresponding evaporating temperature.
2. About 5 to 10 cm away from the Schrader valve affix the t_{0h} sensor of a temperature recorder. Place the second temperature sensor of the recorder in the cooler air inlet. The distance between the air cooler and the t_{L1} sensor should be 15 to 20 cm. The air inlet temperature sensor may not move relative to the wall or other components.
3. To determine the superheat factor, only use measurements taken during stable cold storage operation, when the cooler is not subject to icing loads. It is imperative that the setting time, 15 minutes for each expansion valve, be observed. The cooling process should not be interrupted during this time period. If necessary, provide sufficient heat loading e.g. by opening the door, during the measuring period. When these prerequisites are met, the superheat factor can be determined by analyzing the results of the measurement.
4. From the evaporating temperature t_0 as determined and the actual air inlet temperature t_{L1} as read from the temperature recorder, the air inlet temperature difference Δt_1 (DT1) can be calculated in Kelvin [K].
5. From the evaporating temperature t_0 as determined and the actual superheat temperature t_{0h} as read from the temperature recorder and measured over a sufficient amount of time, Δt_{0h} (Dt_{0h}) can be calculated in [K]. Now use the gauge to locate the calculated Δt_1 (DT1) on the calculated Δt_{0h} (Dt_{0h}). If the black arrow points to the green area (marked **ok**), the expansion valve has been set correctly. Please take due note of the setting instructions provided by the expansion valve manufacturer.
6. After removing the P_0 suction pressure gauge, the cap on the Schrader valve must be screwed on again.
7. If soldering is carried out near the Schrader valve, protect it from heat or unscrew the gasket.

Order now!
As a convenient tool for the technician, on request Küba can also provide an easy to use gauge. You can order this expansion valve calculator at no cost via fax ++49 (0)89 / 744 73 - 107 or at marketing@kueba.com.

Assembly

Suction line (not with brine operation) ①

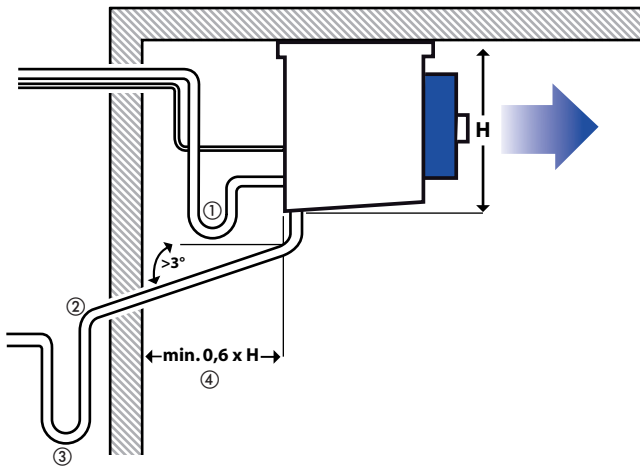
If the suction line cannot be laid on an incline to the evaporator an oil collector should be installed. The high speed of the refrigerant in the bend will ensure that oil is recirculated to the compressor. The bend should be located below the cooler so that the air cooler capacity is not affected by oil collecting in the air cooler.

Condensation water line ②

The condensation water line must always be laid at an incline great enough to ensure that the water can flow out. In cold storage areas with an ambient temperature below 4 °C, plan to use trace heating to prevent the condensation water from freezing in the line.

Trap ③

Installing a trap is required for trouble-free operation and not just from an energy perspective. If an air cooler is operated without a trap, it always takes in „the warmer air“ at higher temperatures and humidity from outside of the Cold Room. This „warm air“ significantly reduces the air cooler capacity and can, depending on temperature level, lead to ice formation and total failure of the system. The trap should always be installed outside of the Cold Room. Each cooler should have its own trap. Otherwise there is a risk of interaction.

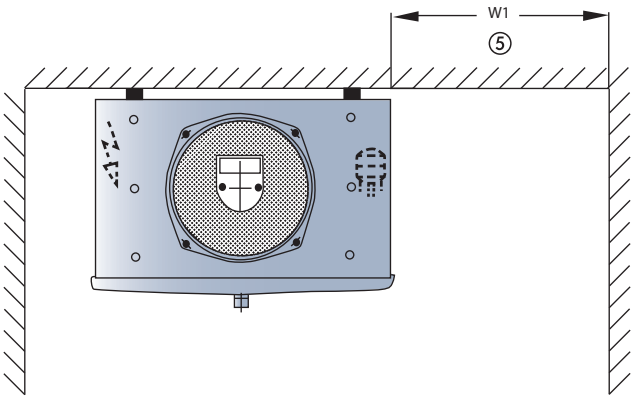


Wall clearance ④

Maintain a sufficient wall clearance to ensure optimum air cooler air flow rates. No tubes, etc. should pass through this minimum clearance area. In some circumstances this can lead to uneven frost build-up and loss of capacity. The recommended clearance always corresponds with the free intake area.

Side clearance ⑤

Side clearance should be selected such that service work can be carried out. This, together with the wall clearance ④, should be equal to at least the area of the air inlet. This ensures a 100% air flow rate and full cooling capacity.



Glossary

Standards:

HACCP
Hazard **A**nalysis **C**ritical **C**ontrol **P**oints
- Preventative system with the aim of guaranteeing the safety of food and for consumers
- Integrated into German law since 1998 as part of the food hygiene ordinances

EN 328
European standard 328
- April 2003: heat exchanger testing procedure for determining performance criteria of forced convection Air Coolers
- Takes new refrigerants into consideration, e.g. R 404A, R 407C, R 410A

Thermodynamics / heat flow::

t_{L1}
Air inlet temperature into the air cooler

t_{L2}
Air discharge temperature from the air cooler

t_0
Evaporating temperature at the evaporator outlet (coil suction / suction line)

t_{0h}
Overheating temperature (at the suction line connection of the evaporator)

DT1
Temperature difference between the air inlet temperature and the evaporating temperature

K
Kelvin
- SI unit for thermodynamic temperature
- Used to specify temperature differences

Overheating ratio Dt_{0h} or Δt_{0h}
- Indicator for optimum expansion valve setting
- Difference between t_{0h} and t_0 divided by the difference between t_{L1} and t_0
- $\Delta t_{0h} = t_{0h} - t_0 / t_{L1} - t_0$
- Optimum 0,65
- „Δt_{0h}" 0,65 yields an evaporator rating of 100 %
- For deviations, see Küba expansion calculator
- $Dt_{0h} < 0{,}65$: Open E-valve
- $Dt_{0h} > 0{,}65$: Close E-valve

$\dot{Q}_0$
Cooling capacity
- Unit: kW

k-Wert
Heat transfer coefficient
- Unit: W/m^2K
- Measure of the heat flow at a temperature difference of 1 K per second through $1m^2$ component
- For heat exchangers, depending on: materials used, thickness of the material, tube arrangement, form of fins, degree of frost build-up or contamination

$\dot{V}_L$
Air flow rate or air quantity (of the air cooler)
- Unit: m^3/h

w_L
Air speed
- Unit: m/s

Air throw
Air throw range in metres
- Distance from air cooler to the point at which the air speed falls below 0,50 m/sec.

Δp
Pressure drop
- e.g. in tubes that carry refrigerant or coolant (tubing network)
- Air friction losses

Heat exchanger:

A
Surface
Calculating surface area in accordance with Eurovent:
- Unit: m^2
- For exchange surfaces available for heat transfer The fin surface for tube channels is deducted. Fin sections, cut edges (fin thickness) and edge waves are not taken into consideration.
- Calculating formula in accordance with Eurovent:
  $A= 2(LZ-1) \times (LB \times LL-D2 \times \pi \times RZ/4) + RZ \times D \times \pi \times Li$
  Li = Finned length
  LA = Fin spacing
  LB = Fin width
  LL = Fin length
  LZ = Number of fins = (Li / LA)+1
  D = Tube outer diameter
  RZ = Number of tubes = RR x RL
  RL = Tube length (perpendicular to air flow)
  RR = Number of tubes (parallel to air flow)

Glossary

HFE
High **F**lux **E**fficiency
• Küba high performance fin/tube system
- That means:
all significant parameters for heat transfer, from refrigerant to chilled air, have been optimised.
In particular, that means:
- Maximum internal heat transfer by adapting refrigerant or coolant speed with
a) tube diameter, wall thickness and spacing, the type and number of internal fins in Cu tubes
b) the number of refrigerant or coolant circuits and line lengths of individual distributions
c) determination of the required diameters of the connections for entering and exiting the coolers
- Maximum surface use by optimising external heat transfer with
a) the correct fin thickness, fin fold form and height of folds
b) lowest possible pressure drop on the air side
c) correct expansion diameter for pressure tight fitting of the fins on the core tube. Too much expansion leads to material elongation and causes hairline cracks that negatively affect temperature range. With too little expansion, a pressure tight connection cannot form between the tube and the fin, which prevents good heat transfer.

Acoustics / sound:

LW(A)
Sound power level (evaluated „A“)
• Logarithmic scale, computed
• Not dependent on distance or installation location
• Sound intensity comparison for forced convection Air Coolers only allowed using sound power
• dB (A)

Lp(A)
Acoustic pressure level (evaluated „A“)
• Value from microphone
• Dependent on distance and installation location of the sound source
• dB(A)

Operating period
• Cooling period between two defrosting cycles
• End of the operating period is defined by the start of fluctuation in the evaporating or overheating temperature in the range of a few Kelvin.

Küba CAL® distributor
• Patented refrigerant distributor for evaporators with multiple injection
• Proven in thousands of applications over 30 years of use
Mode of operation:
First, the approaching mixture of liquid moisture and vapours is separated
• Moisture collects in the lower section of the distributor and flows over grooves into the distributor tubes.
• Vapours remain in the upper section and flow up into the distributor tubes
The separated phases can easily be divided into the required number of distributions/ injections
• Liquid moisture and vapours are brought together again
The high speed of the vapours in the distributor tubes generates negative pressure and pulls the liquid moisture
Advantages:
• lower pressure drop in the distributor system
• optimum refrigerant distribution in all working areas
• maximum surface use and 100% cooling capacity for all operating conditions

Fax Request

Küba Product Information

Fax Request

to ++49(0)89/744 73-107

I would like documentation regarding the following subjects:

- ❑ More copies of the Küba Blue Line brochure
- ❑ Küba Green Line brochure
- ❑ Küba high performance air cooler flyer
- ❑ Price list
- ❑ Spare parts price list
- ❑ „Forum“ customer journal
- ❑ Condenser brochure (CAV/H, CAV/H 05+06, NAV/H)
- ❑ Dry Cooler brochure (GAV/H)
- ❑ Küba Select CD
- ❑ Expansion valve calculator

❑ **Yes,** I would like to order the free newsletter that appears approx. 3 times a year.

My e-mail address is: _____

❑ Our address has changed:

Company: _____

Contact person: _____

Street: _____

Postal code/City: _____

Telephone: _____

Fax: _____

E-mail: _____

❑ **I would not like to receive any more information from Küba.**
Please remove me from your information distribution list.

Notes

Notes

Notes

Notes

You can find Küba products at:

Subject to error and revision

43 0094.392 119 E 2000 Status as of 11/2008

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