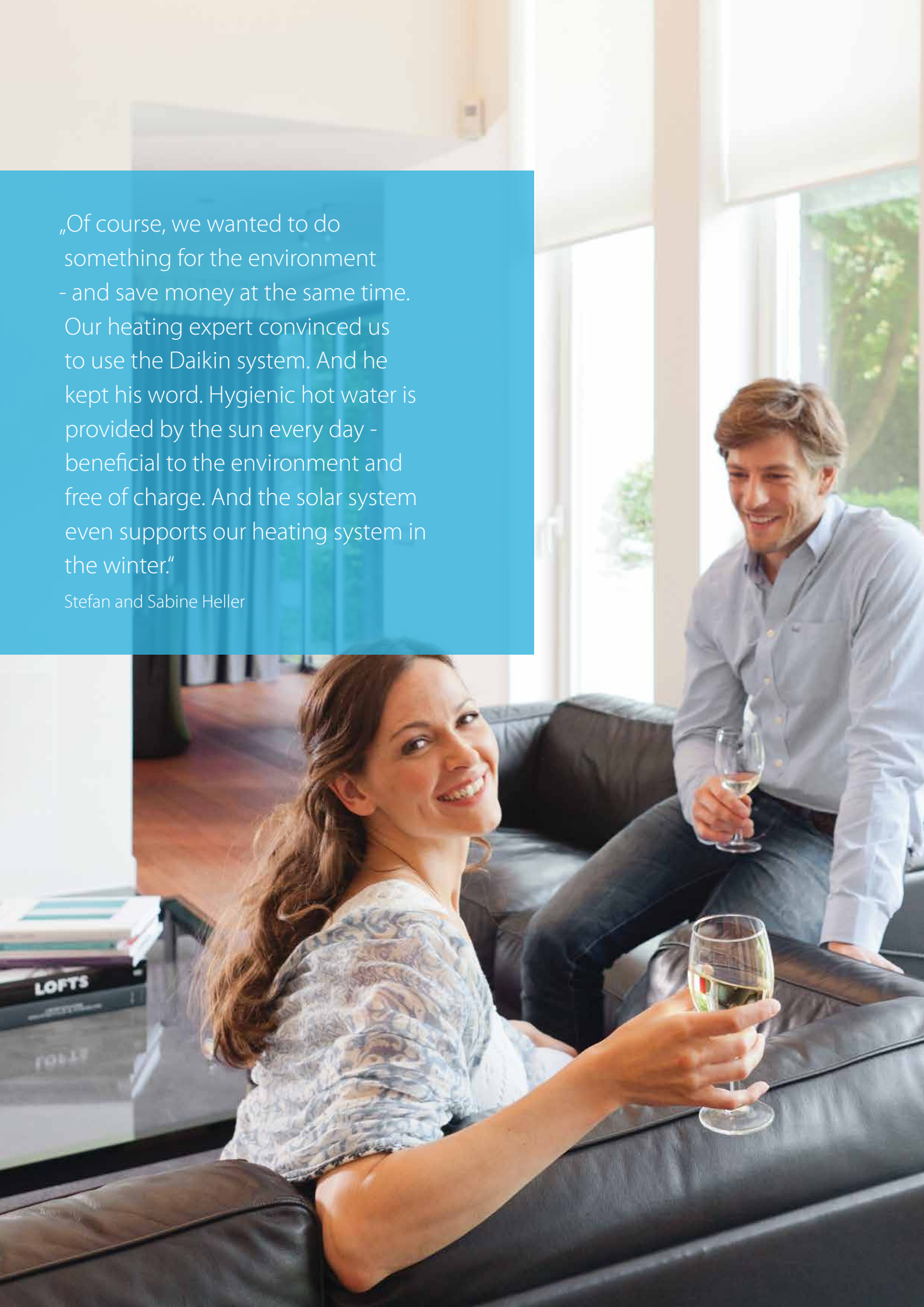
# Daikin Altherma ST

## The solar thermal system for hot water and heating.




„Of course, we wanted to do something for the environment - and save money at the same time. Our heating expert convinced us to use the Daikin system. And he kept his word. Hygienic hot water is provided by the sun every day - beneficial to the environment and free of charge. And the solar system even supports our heating system in the winter."

Stefan and Sabine Heller

# A great combination: Thermal store and solar

## The first thing we need for foodstuffs is clean water

Hot and fresh water is indispensable for every household. Whether for showering, bathing, cooking or hand washing. Having hot water available in the desired volume and at the desired temperature is a significant constituent of our modern life.
The fact that this water is also hygienic is, of course, a prerequisite. Conventional hot water heaters often fail to meet these requirements today. We have therefore placed special emphasis on water hygiene!

## The hygienic Daikin thermal store

The Daikin thermal stores were conceived in accordance with the latest thermal technology and water hygiene requirements. Its structure is fundamentally different from normal large volume hot water storage tanks.
As a result of its design concept it delivers hygienically perfect hot water at any time. The actual heat is not stored in the domestic water itself, but in the storage tank water which is clearly separated from it.
The optimum tank layering ensures that a supply of hot water is always available.

## The ideal addition to your thermal store: The Daikin Altherma Solar Thermal system

If you are planning investment in a new heating system today, you should take the supplementation by a solar system into account from the very start.
The heating system should at least offer the option of being able to supplement it by the addition of a solar system in the future without any problems.
The advantages are obvious. Low energy consumption not only means low costs. It is also a contemporary and responsible action with regard to our environment.

## Daikin Altherma ST solar panels

The Daikin Altherma ST offers a flexible solar thermal system providing water heating and space heating backup, to be used for pressurised solar and drain-back applications. The solar panels convert almost all of the shortwave solar radiation into heat through their highly selective coating. The three solar panel sizes and different assenbly types mean there is flexibility in adapting to roof characteristics. Since all buildings are different, there are various installation options for fitting the flat solar panels onto the roof.

1

2

3

"When the hot water storage tank had to be replaced, I was amazed how much deposit had collected in the old unit.
As a result, our installer recommended us the Daikin thermal store.
The water-hygiene advantages convinced me. I can now enjoy every drop again."

Sabine Hiller about her experiences using the Daikin thermal store

# Think DHW hygiene when buying a heating system

## The Daikin thermal store principle
## The drinking water

Is contained in a high-performance heat exchanger made of durable stainless steel (INOX). Your drinking water remains perfectly hygienic.

## The storage tank water

Is added at commissioning and serves only for thermal storage. It is not exchanged and consumed.

## Energy saving

The inner and outer walls are impact-resistant polypropylene, the space in-between is filled with highly heat insulating foam. This results in very good heat insulation values and minimum surface losses.
This protects the environment and your wallet.

## It's better to trust experience

Daikin Heiztechnik (formerly known as ROTEX) has been making thermal storage tanks for optimum water hygiene for more than 25 years. The design of the storage tanks has been continuously optimized to ensure that the heated domestic water only stays in the storage tank. This means that neither deposits nor bacteria can arise.

### Your benefits with the Daikin thermal store

**Outstanding efficiency**
› Efficient energy saving thanks to full thermal insulation made from PU rigid foam

**Hygiene**
› Highest level of hygiene by the separation of the storage tank water from the domestic water
› No deposits, no legionella generation

**Meets your needs**
› Minimum space requirement and simple installation due to compact design and low weight
› Long-life and safeas a result of the used materials plastic and stainless steel
› Low scaling
› Sophisticated innovative technology, with 25 years' experience
› Modular system: Interconnection of several storage tanks possible for high-volume hot water demand
› Connection to the most varied of heat generators and heat sources

## Hot water of the highest quality

The structure of the thermal store ensures optimum water hygiene since the water to be heated is carried in a pipe system.

Deposits of sludge, rust, sediments and even the generation of dangerous legionella bacteria which can arise in large volume tanks are not possible.

The tank temperature of the thermal store can be reduced from 60 °C to 50 °C, according to DIN 1988-200.*

* The amended DIN 1988-200 permits reduction of the tank temperature from 60 °C to 50 °C in central hot water storage tanks with increased water exchange rates (in Germany).

Daikin Altherma ST thermal store with 300 liter storage capacity


Daikin Altherma ST thermal store with 500 liter storage capacity


ECH$_2$O

**Low scaling:** On commissioning, the storage tank is filled with tap water which is not exchanged during operation. Thus, only the lime contained in this water can be deposited; all the heat exchanger pipes remain free of limescale, as does the electric immersion heater, which is available as an option. On the inner surface of the heat exchanger pipes, the high flow speed when the water is removed releases smaller scale deposits.

**Long-life and safe:** The materials used (plastic and stainless steel) ensure the thermal store has a particularly long life.

# The clean solution for every requirement

## Variable in use*

The heating of the storage tank water, and thus the charging of the storage tank, can take place using various different heat sources:

› With heat generator: Boilers, heat pumps or remote heat generate the heat that is introduced via the stainless steel heat exchanger
› With solar energy: E.g. via the Daikin solar system.
› With an electric immersion heater: The hot water (domestic) is heated by an electric immersion heater made of stainless steel which is immersed in the storage tank water.

## Also for large-volume hot water demand

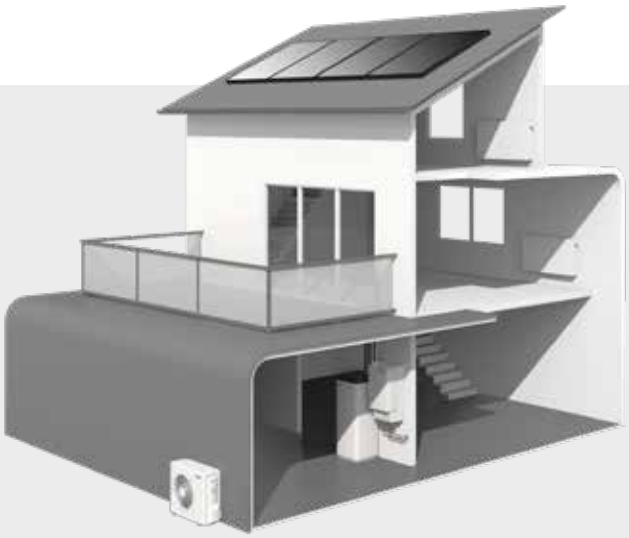
The thermal store can be adapted flexibly to your individual hot water requirements. For this application several thermal stores are connected together in a modular fashion so that even output distribution is achieved and output capacities can be created of virtually any size.

## Two different thermal store versions: Combinable with boilers

This thermal store is the ideal addition for a oil or gas condensing boiler. In combination with Daikin Altherma ST, the free-of-charge power of the sun is exploited in a highly-effective manner for hot water generation and heating support. This combination convinces by its highest level of energy efficiency thanks to low heat losses, perfect water hygiene and unlimited hot water convenience.

## Combinable with heat pumps

We have developed this version specially for combination with a Daikin air-to-water heat pump. This thermal store is designed for low flow temperatures while providing highest DHW convenience. It is the heart of the Daikin heat pump system, stores the heat obtained then transfers it to the heating system at the required time. In combination with Daikin Altherma ST, the free-of-charge power of the sun is exploited in a highly-effective manner for hot water generation and heating support.



## Example of an installation

Daikin Altherma R Hybrid working with a gas boiler and solar thermal panels connected to a thermal store for hot water generation and heating support.

*The right tank model to suit your requirements can be seen in the selection matrix on page 14.

**Daikin Altherma ST solar panels - flexible assembly**

The thermal solar panels convert almost all of the shortwave solar radiation into heat through their highly selective coating. The three different solar panel sizes mean there is flexibility in adapting to roof characteristics. Since all buildings are different, there are various installation options for fitting the Daikin flat solar panels onto the roof. The solar panels can be fitted onto the tiles (on-roof), into the roof (in-roof) or also with a special substructure onto a flat roof.

The ideal addition:

# Daikin Altherma ST - the solar system for hot water and heating

## Sunny outlook

Daikin Altherma ST utilises free solar energy to back up the heating system. High performance solar collectors developed and produced in-house at Daikin Heiztechnik (Germany) can be installed in a variety of ways and offer the highest levels of energy efficiency.

## Low expenditure – high yield

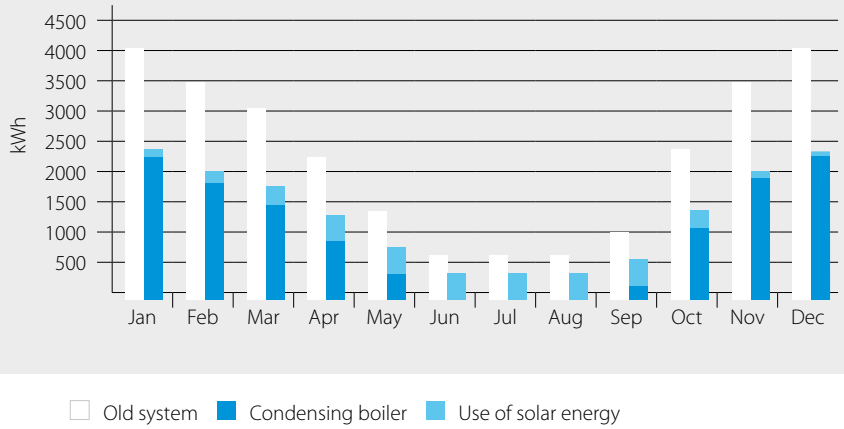
At peak levels, 80 % of the solar energy that has been captured can be converted into usable heat. The high efficiency of Daikin flat-plate collectors makes this possible. Solar energy and a Daikin heat generator complement each other perfectly. Depending on demand, the condensing boiler or the heat pump contributes the necessary amount of heat to the heating system.

## The perfect store for use with solar – the right temperature at every level

Solar collectors work more effectively the colder the water flowing through them. In solar thermal systems, it's important for the thermal store to achieve the widest possible thermal stratification. With the Daikin Altherma ST thermal store, cool fresh water is fed into the corrugated pipe heat exchanger at the lowest point in the store.
From here it travels upwards and is heated employing the instantaneous water heater principle. This ensures maximum cooling in the lower part of the store, from which the collectors are supplied with water.
The degree of thermal stratification this creates in the thermal store significantly increases the benefit to be gained from the solar thermal system as a whole.

### Your benefits with the Daikin Altherma ST solar system

- Efficient utilisation of free solar energy for hot water and heating
- Hygienic hot water generation
- Optimum temperature stratification in the Daikin solar thermal store increases solar use
- Perfect incorporation with the most varied of heating systems

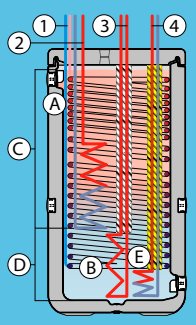



**Monthly energy consumption of an average single-family house**
The diagram shows the monthly energy consumption of an average single-family home. It compares two system types:
The white bar represents the energy consumption using an old boiler. The blue/light blue bar shows a system with the floor standing gas condensing boiler Daikin Altherma C Gas $ECH_2O$ with 4 solar panels.

Daikin Altherma ST solar panels

**Water and sun. Optimum combination**
The pronounced temperature layering makes the thermal store the ideal hot water storage in combination the solar panels.

**Pressurised solar system**



# Solar systems by Daikin

## Daikin Altherma ST solar systems: 2 possibilities, always the best choice

**Daikin Altherma ST is available in two different variants, that meet all structural conditions and individual requirements.**

### 1. The pressurised solar system (P)

The pressurised solar system impresses with its simple installation and is suitable for all applications and buildings. It operates efficiently and safely at any desired length of pipes and feed height. The well-engineered structure of the Daikin solar thermal store means that an additional plate heat ex-changer is not required.
A bivalency heat exchanger for pres-surised solar or other heat sources is already incorporated.
That makes the system simple and flexible.

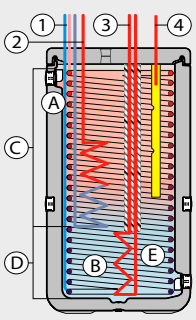
### 2. The direct Drain-Back system (DB)

If the constructional conditions permit, we recommend the unpressurised and direct Drain-Back system.
The water in the store is supplied directly and without heat exchanger to the solar panels, heated and then stratified into the store. This considerably increases the efficiency of the solar collectors and the entire utilisation of the installation. Since the system is unpressurised, components which would otherwise be required are not necessary, such as the expansion tank, pressure relief valve, pressure gauge and heat exchanger.

The solar panels are only filled if there is enough heat from the sun and if the thermal store can absorb heat. The fully-automatic control system controls the system independently to provide optimum utilisation of the solar energy. If the sunshine is insufficient, or if the solar thermal store does not need any more heat, the feed pump switches off and the entire solar system drains into the thermal store. The addition of antifreeze agents is not required since the panel surface is not filled with water when the system is not operating. This is a further plus from the environmental perspective. The principle functions only if the connection pipes in the building and on the roof are installed with a constant gradient. If this is not possible, the pressurised solar system is the optimum alternative.

Daikin Altherma ST uses solar energy for water heating and effectively supports heating. In all Daikin solar thermal stores, solar heating support has also been integrated ready for connection, alongside the solar hot water generation. If the solar heat is not consumed immediately, the Daikin solar thermal store can store large volumes of solar heat and it is possible to use the heat for hot water or heating hours later or even the next day.

**Drain-Back solar system**




A storage tank
B Unpressurised storage tank water
C Hot water zone
D Solar zone
E Heating support zone

1 Potable water
2 storage tank charging
3 Heating support
4 Solar panel connection

# Compact combination of heat generator and solar thermal store

## Dream dimensions for your heating and hot water in just 0.36 $m^2$.

The Daikin thermal store principle has also been applied to the heat generators with integral thermal store. Irrespective of whether with or without solar energy exploitation, the Daikin Altherma C Gas $ECH_2O$ and Daikin Altherma 3 R $ECH_2O$ are an optimum combination of high-efficiency heat generator and solar thermal store. As a result of the uncompromising combination of these functions, these compact units set new standards with regard to space saving and energy exploitation.
An area of only 0.36 m2 (300 litre storage volume) or 0.64 m2 (500 litre storage volume) is sufficient to accommodate the complete heating, hot water generation and stratified solar thermal store.

## Gas condensing technology + solar

The Daikin Altherma C Gas $ECH_2O$ combines modern gas condensing technology with solar thermal store in the smallest possible space. The integration of the condensing heating boiler on top of the thermal store means that the surface losses of the unit are kept to a minimum. Losses as a result of cooling,as occur in usual boiler storage combinations, do not occur here.
This ensures that you save even more energy.

## Air-to-water heat pump + solar energy

Daikin offers with the Daikin Altherma 3 R $ECH_2O$ especially compact and pioneering comprehensive solutions. Both units exploits free and regenerative environmental energy from the sun and the air and can not only provide heating but can also cool if required.

## The Hybrid central unit – open for all energytypes

All Daikin solar thermal stores can also be used as an efficient thermal store for additional heat sources. For example, in addition to a solar system, a fireplace with water pocket can be used to provide support during heating and hot water generation. If you are not installing a solar system directly, it can retrofitted quickly and easily at any time.

1 Air-to-water heat pump Daikin Altherma 3 R $ECH_2O$

2 Gas condensing boiler Daikin Altherma C Gas $ECH_2O$

# Efficiency made transparent

## Energy efficiency labels for heating systems

We're familiar with these labels on fridges, televisions and other electrical appliances. From September 2015, heat generators and water heaters bear their own EU energy efficiency labels. These labels make it easier to compare individual heating products and decide which ones to buy.

## How the energy efficiency classes are determined

The product's seasonal energy efficiency determine its energy efficiency class. Put simply, this indicates the relationship between the total energy input and the useful heat output. The greater the proportion of renewable energy used to generate heat, the higher the efficiency class. As a result, heat pumps are usually in the top efficiency classes, followed by gas and oil condensing boilers, with conventional boilers bringing up the rear, as they tend to perform comparatively poorly against the relevant criteria.

## Efficiency classes for products and systems

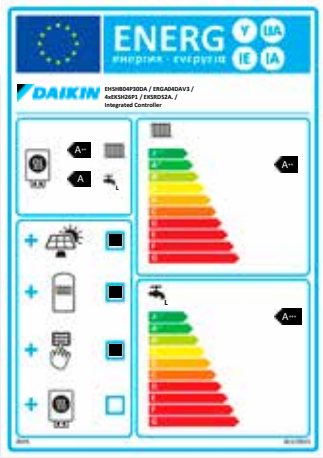
Individual heat generators each bear a product label. The efficiency of a heating system depends not only on the heat generator, but on several components. That is why the combination or package label was introduced. This covers the heat generator plus other components such as the controller, cylinders, solar thermal systems and/or an additional heat generator. The combination label is calculated from the efficiency values of the individual appliances and devices.

## Excellent package label ratings with solar

Hooking up a solar thermal system is the most effective way to reach a higher overall system efficiency class.
The Daikin thermal store are already optimised for hooking up with a solar thermal system and in combination with Daikin Altherma ST solar panels, this system will become your own personal ‚solar heater'.

## Expert advice

Every building is different. Your choice of a new heating system, especially as part of modernisation, should not be based solely on the efficiency rating. Depending on the characteristics of your building, a heating system with a low efficiency rating may consume less energy than a system with a higher rating. Consequently it's important to get expert advice and help with sizing: that's where your Daikin partner comes in useful.




**E.g. Package label:**
Daikin Altherma 3 R ECH$_2$O with 4 solar panels

**Safe in the knowledge it's Daikin**
All Daikin products are tested and meet the criteria in the Ecodesign Directive. For both individual products and packaged solutions, energy labels are a reliable indicator of efficiency class.

Perfectly matched in terms of their individual components, our complete systems provide both maximum convenience and the highest safety standards.

# Specifications





| **Thermal store EKHWC* for combination with boiler** | | | | **EKHWCH500B** | **EKHWCB500B** | **EKHWCH300PB** | **EKHWCH500PB** | **EKHWCB500PB** |
|---|---|---|---|---|---|---|---|---|
| Tank | Water volume | | l | 477 | 477 | 294 | 477 | 477 |
| | Energy efficiency class (Scale A-G) | | | B | B | B | B | B |
| Dimensions | Unit | Height | mm | 1660 | 1660 | 1650 | 1660 | 1660 |
| | | Depth | mm | 790 | 790 | 595 | 790 | 790 |
| | | Width | mm | 790 | 790 | 615 | 790 | 790 |
| Weight | | | kg | 74 | 79 | 53 | 80 | 86 |
| Potable water capacity | | | l | 24.5 | 24.5 | 19.0 | 25.9 | 25.9 |
| Hygienic hot water generation on the instantaneous heater principle | | | | • | • | • | • | • |
| Boiler combination | | Daikin Altherma C Oil | | • | • | • | • | • |
| | | Daikin Altherma 3 C Gas W | | • | • | • | • | • |
| | | Existing boiler | | • | • | • | • | • |
| Solar combination | Drain-Back | | | • | • | | | |
| | Pressurized solar | | | | | • | • | • |
| | Solar heating support | | | • | • | | • | • |
| Dual mode solution (combination with additional heat generator or swimming pool) | | | | | • | | | • |


| **Thermal store EKHWD for combination with boiler and heat pump** | | | | **EKHWDH500B** | **EKHWDB500B** |
|---|---|---|---|---|---|
| Tank | Water volume | | l | 477 | 477 |
| | Energy efficiency class (Scale A-G) | | | B | B |
| Dimensions | Unit | Height | mm | 1660 | 1660 |
| | | Depth | mm | 790 | 790 |
| | | Width | mm | 790 | 790 |
| Weight | | | kg | 73 | 76 |
| Potable water capacity | | | l | 24.5 | 24.5 |
| Hygienic hot water generation on the instantaneous heater principle | | | | • | • |
| Boiler combination | | Daikin Altherma C Oil | | • | • |
| | | Daikin Altherma 3 C Gas W | | • | • |
| | | Existing boiler | | • | • |
| Heat pump combination | | Daikin Altherma R HT | | • | • |

**Innovative heat storage concept – Hygienic, flexible and future-oriented**
All Daikin products with the ECH$_2$O label are characterized by a unique heat storage principle.
Particularly space-saving, with the highest warm water comfort and open for additional heat sources.

ECH$_2$O




| Thermal store EKHWP* for combinaton with heat pumps | | | | EKHWP300B | EKHWP500B | EKHWP300PB | EKHWP500PB |
|---|---|---|---|---|---|---|---|
| Tank | Water volume | | l | 294 | 477 | 294 | 477 |
| | Energy efficiency class (Scale A-G) | | | B | B | B | B |
| Dimensions | Unit | Height | mm | 1650 | 1660 | 1650 | 1660 |
| | | Depth | mm | 595 | 790 | 595 | 790 |
| | | Width | mm | 615 | 790 | 615 | 790 |
| Weight | | | kg | 58 | 82 | 58 | 89 |
| Potable water capacity | | | l | 27.1 | 29.0 | 27.1 | 29.0 |
| Hygienic hot water generation on the instantaneous heater principle | | | | • | • | • | • |
| Heat pump combination | | Daikin Altherma (3) R up to 8 kW | | • | | • | |
| | | Daikin Altherma R & Daikin Altherma 3 H up to 16 kW | | | • | | • |
| | | Daikin Altherma R HT | | • | • | • | • |
| | | Daikin Altherma (R/H) Hybrid | | • | • | • | • |
| Solar combination | Drain-Back | | | • | • | | |
| | Pressurized solar (1) | | | | | • | • |
| | Solar heating support (2) | | | | • | | • |
| Notes | | | | (1) If a pressurized solar combination or a bivalency solution is to be combined with a heat pump, we can use the Daikin Altherma 3 $ECH_2O$ bivalent model.<br>(2) Heating support not in combination with Daikin Altherma (R/H) Hybrid. | | | |




| Solar panels EKS | | | | V21P | V26P | H26P |
|---|---|---|---|---|---|---|
| Dimensions | | Height | mm | 2000 | 2000 | 1300 |
| | | Width | mm | 1006 | 1300 | 2000 |
| | | Depth | mm | 85 | 85 | 85 |
| Weight | | | kg | 35 | 42 | 42 |
| Volume | | | l | 1.3 | 1.7 | 2.1 |
| Surface | Outer | | $m^2$ | 2.01 | 2.6 | 2.6 |
| Coating | | | | Micro-therm (absorption max. 96 %, Emission ca. 5% +/- -2%) | | |
| Absorber | | | | Harp-shaped copper pipe register with laser-welded highly selective coated aluminium plate | | |
| Glazing | | | | Single pane safety glass, transmission +/- 92 % | | |
| Allowed roof angle | | Min. | ° | 15 | 15 | 15 |
| | | Max. | ° | 80 | 80 | 80 |

The solar panels are standstill resistant in the long-term and are tested for thermal shock.
Minimum collector yield over 525 kWh/$m^2$ at 40% covering proportion, (location Würzburg, Germany).

## Our promise...

... is to ensure that customers can depend on Daikin for the ultimate in comfort, so that they are free to focus on their own working and home lives.

We promise to dedicate ourselves to technological excellence, a design focus and the highest quality standards so that our customers can trust and rely on the comfort we deliver.

Our promise to the planet is absolute. Our products are at the forefront of low energy-usage and we will innovate to further reduce the environmental impact of our heating solutions.

From residential to collective heating solutions, from renovation to new build, we commit ourselves to answer all our customers' needs. Our heat pump DNA combined with our in-house combustion development positions Daikin as a leader, for now and the decades to come.

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