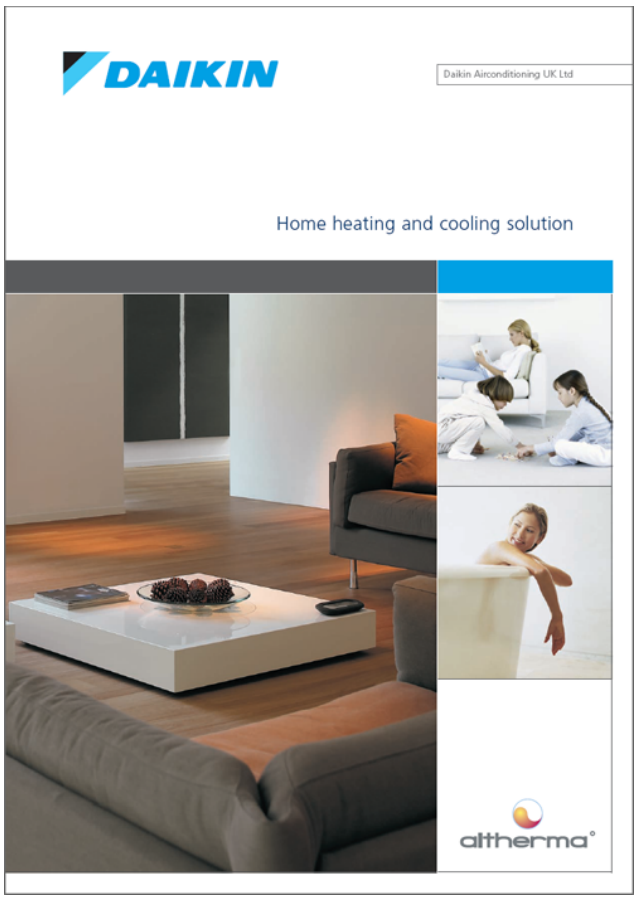

Daikin Air Conditioning

Home heating and cooling solution.

ALTHERMA

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Clitheroe, Lancashire
BB7 1PL, UK

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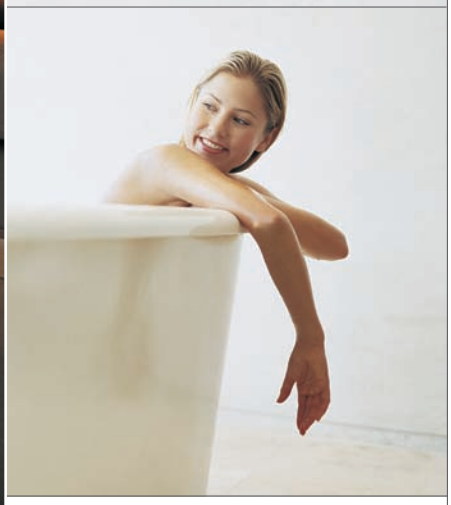
Daikin Airconditioning UK Ltd

Home heating and cooling solution

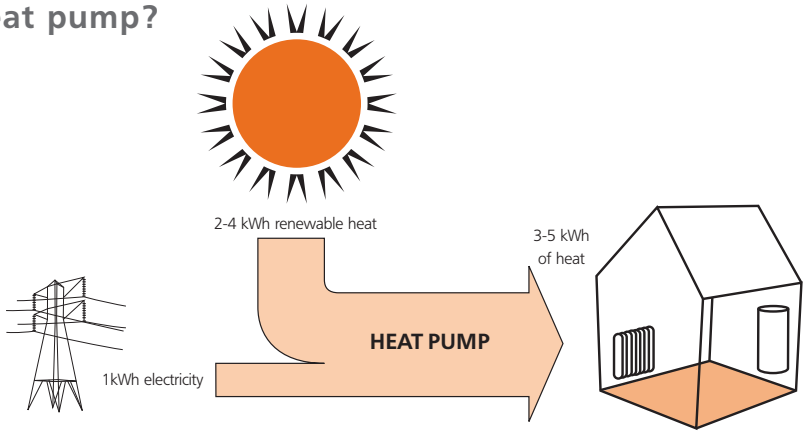


altherma

Heat pump technology at its best

The Daikin Altherma total heating and cooling system is based on heat pump technology and represents a flexible and cost effective alternative to a fossil fuel boiler, with a cooling option. The inherent energy efficiency characteristics of Altherma make it an ideal solution to reduce energy consumption and CO_2 emissions.

What is a heat pump?



A heat pump extracts low temperature energy from the environment and increases its temperature for heating purposes. Heat pump efficiencies are normally quoted as the coefficient of performance of the system, these are typically in the range 3 to 5. In other words, extracting heat from renewable sources requires just 1kW of electrical input in order to generate 3kW to 5kW of heating output. Heat pump systems therefore, are 3 to 5 times more efficient than fossil fuel boilers and are more than capable of warming a house completely, even during the lowest winter temperatures. The increasing popularity of these heating systems is reflected by their overwhelmingly successful application in the cold climates of Scandinavia.

Millions of heat pumps are installed across Europe and the market is growing rapidly due to increasing awareness of the system's obvious benefits. Recent research indicates that during the last five years alone heat pump sales have doubled[1].

[1] Source: BSRIA Report 18733/3 Edition 2.

Daikin: the leader in heat pump technology

Altherma's remarkable energy efficiency stems from its unique combination of the highly efficient Daikin inverter driven compressor and variable set point temperature capability, which enables the system to match its output precisely to the actual heating demand of the building. Furthermore, comfort is maximized and energy consumption minimized by its ability to regulate heat emitter temperature to the optimum level.

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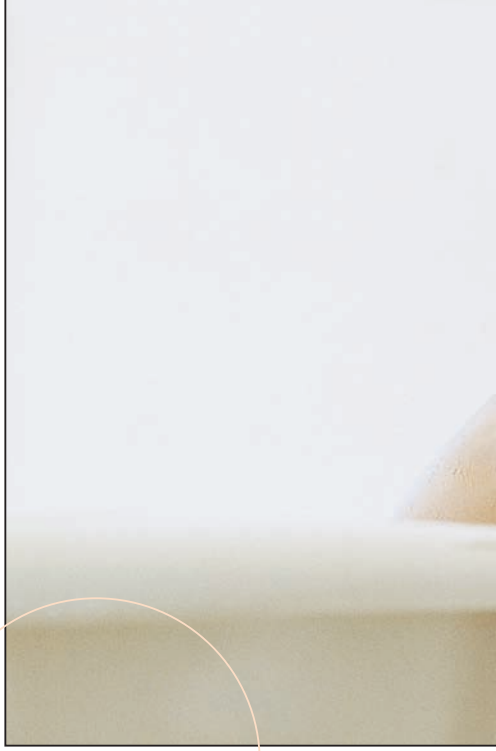
Daikin Airconditioning UK Ltd,
Weybridge Head Office

Revolution based on a great tradition

Daikin has more than 40 years' experience in the production of heat pumps, manufacturing over a million units a year for both residential and commercial applications. The system is manufactured entirely 'in house' in Daikin's state of the art factories, including its all important compressor unit. Daikin produces all of its compressors, some 80% for use in heat pump applications. Clearly, experience of this order affords the company a considerable technological advantage, enabling it to maintain its traditional position as the market leader and apply existing technology to the innovative Altherma system.



Low temperature heating Combined advantages

Rapid progress in heating technology and improved building insulation allows water temperatures of 55°C or less to be sufficient nowadays to heat a house thoroughly, even at extremely low outside temperatures. High levels of comfort with the added benefit of lower energy consumption can therefore be achieved due to the smaller temperature differential between the heat emitter and the room itself. Most modern water based heating systems operate at low temperatures, supplying heat via radiators or underfloor heating systems, individually or in combination.

Optimised use of Heat Pump technology

Heat pumps are inherently clean and reliable, and traditionally use 'water to water' or 'air to air' technology. The Altherma 'air to water' system, however, represents the best of both technologies, combining the accessibility of air as the heat source, low investment cost[2], emission free operation, easy installation and maintenance, with the comfort of using a water based heating system.

Free energy from the air

Heat sources for low temperature heating systems include conventional fossil fuel boilers and electricity. Altherma as an alternative is a far more efficient solution. More than 2/3 of the energy used by Altherma over the year is freely available in the air. The system can operate down to -20°C[3]. As a result, Altherma can generate all the heat necessary to warm a house comfortably. All heat pumps require electrical input in order to upgrade the low temperature. Altherma for example, can supply 3.8kW[4] of heat to a building from just 1kW of electrical input.

[2] No high cost drilling or extensive excavation work is required nor the construction of a chimney. Consequently, the system is ideally suited for inner city application or where space is limited.
[3] Including back up heater.
[4] Preliminary at Eurovent design conditions (7°C ambient / 35°C leaving water temperature).

New houses

New apartments

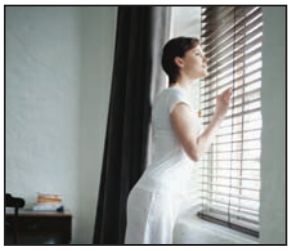
Flexible application, Easy installation

The Altherma system features an outdoor and indoor unit, both are compact. The outdoor unit can be located discreetly outside new and existing residential buildings. The indoor unit can be installed in any convenient space, removing the need for a dedicated technical room.

Renovation projects

Total solution for year round comfort

In addition to the basic comfort requirements of providing heat, Altherma can deliver even more. The system is designed to supply your sanitary hot water needs all year round and can be selected with a cooling option for the hot summer months, thus satisfying your desires for all year round comfort.

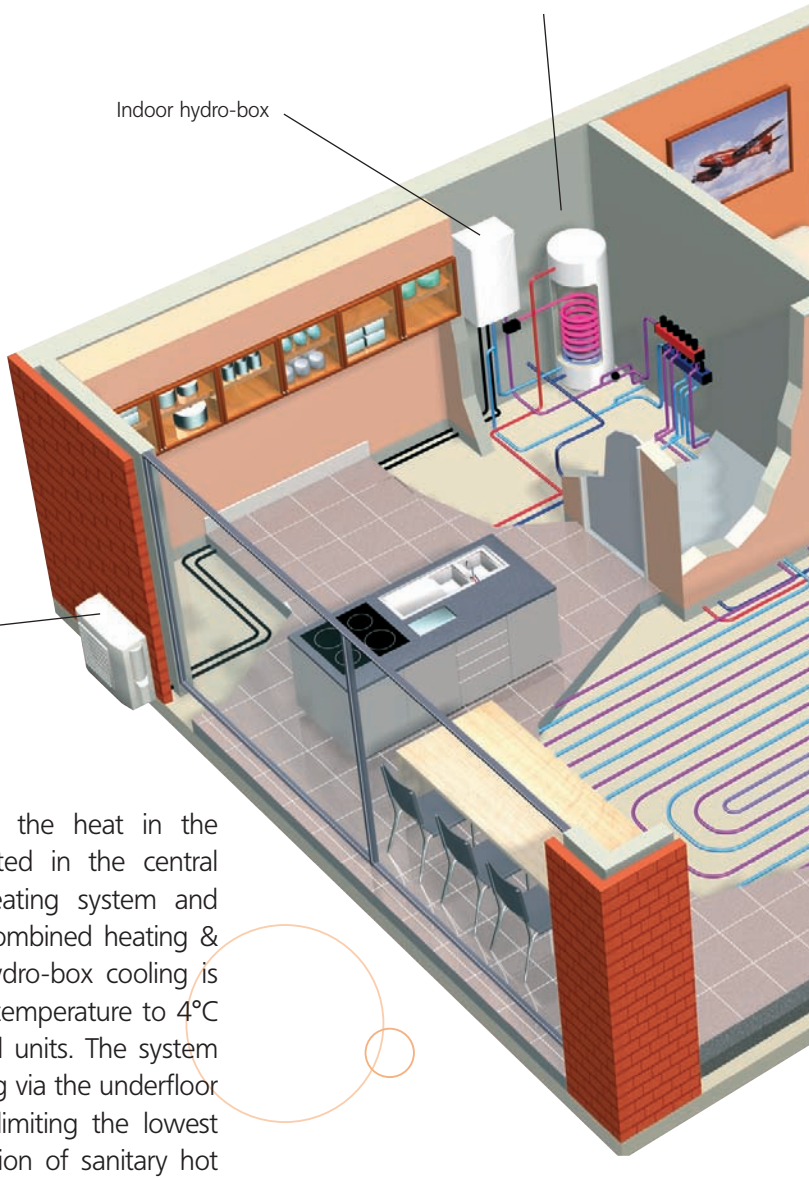


The system at a glance

Altherma is a split system consisting of an outdoor unit and an indoor hydro-box that can be connected to all standard low temperature radiators and underfloor heating systems.

Outdoor unit

The outdoor unit extracts free low temperature heat from the surrounding air and increases its temperature. Upgraded heat is then transmitted via the refrigerant circuit to the indoor hydro-box.



Indoor hydro-box

The indoor hydro-box transfers the heat in the refrigerant to the water circulated in the central heating radiators, underfloor heating system and sanitary hot water tank. In the combined heating & cooling version of the indoor hydro-box cooling is achieved by reducing the water temperature to 4°C and circulating it through fan coil units. The system can also provide moderate cooling via the underfloor heating system or radiators by limiting the lowest water temperature. The preparation of sanitary hot water is performed by switching the system from cooling or heating to sanitary mode.

Sanitary hot water tank

A purpose built stainless steel water tank, constructed to maintain the highest levels of energy efficiency, is available to meet sanitary hot water needs. The combination of an electric booster heater in the upper part of the tank and a heat pump heat exchanger in the lower part ensures the lowest possible energy consumption with rapid water heating. In addition, a built in function raises the water temperature to 70°C or higher at least once a week to remove any possibility of legionella growth.

Typical system configuration including optional sanitary hot water tank and optional cooling

System controls

System controls and the user interface are contained within the hydro-box and feature a weekly timer that enables the indoor temperature to be controlled according to user requirements. The timer is programmable on an hourly or daily basis so that temperatures can be reduced at night or during holidays and increased prior to rising in the morning or returning home. User comfort according to personal preference is thus maintained at all times. Where control over individual room temperatures and comfort levels is needed a conventional room controller should be added.

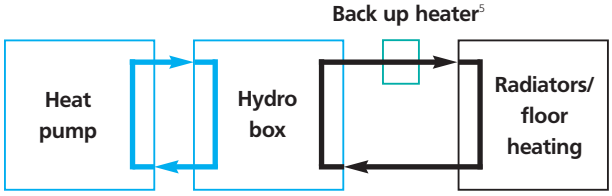
Configuration flexibility

Altherma can be configured in three ways - Monoenergetic, Monovalent and Bivalent - to optimise the balance between investment and running costs, and to extend the types of projects for which Altherma can be used. Professional Daikin installers will provide details on how each of these versions can be applied to any particular building.

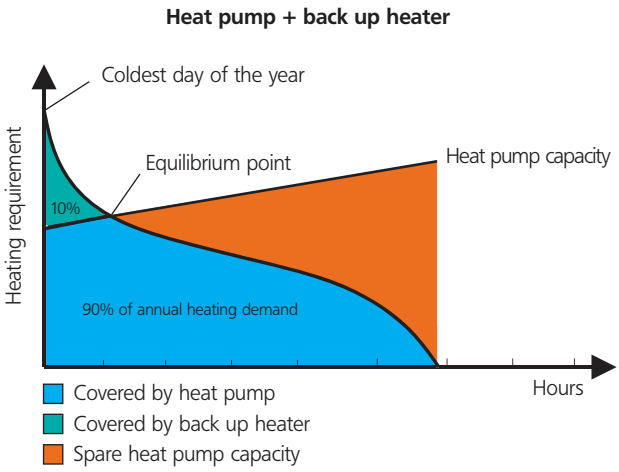
In addition to these three configurations, Altherma can also be combined with alternative renewable heat sources such as solar panels for domestic hot water heating.

The Monoenergetic Altherma system

The heat pump is sized to provide 90-95% of the annual heating requirement, with the remaining 5-10% supplied by a small electric back up heater. A good practice is to select the heat pump to cover 60% of the heating demand on the coldest day. Using Altherma in the monoenergetic configuration is recommended for the majority of applications because it offers the optimum balance between investment costs and running cost.



Back up heater is only used below the equilibrium point.



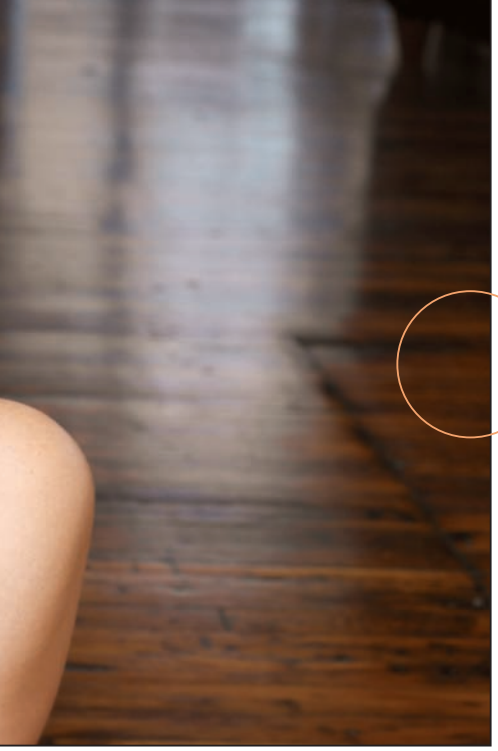
Definitions:

Monoenergetic operation:
The heat pump is used in combination with a small electric back up heater when demand for heating peaks on the coldest days of the year.

Monovalent operation:
The heat pump is used on its own and is sized to cover peak demand.

Bivalent:
The heat pump is combined with a conventional fossil fuel boiler.

[5] Mounted inside the hydro box.

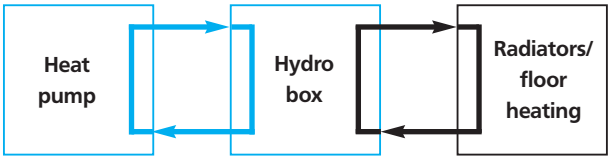


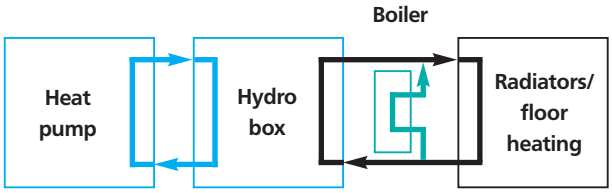
The Monovalent Altherma system

The heat pump is sized to provide 100% of the heating requirement on the coldest day of the year. This solution is recommended for ultra-low energy houses and for moderate climates without severe winters. The initial investment costs may be higher but energy consumption is the lowest of all systems.

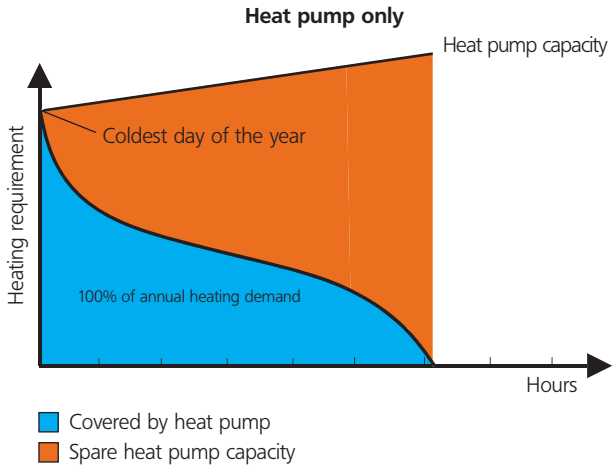
The Bivalent Altherma system

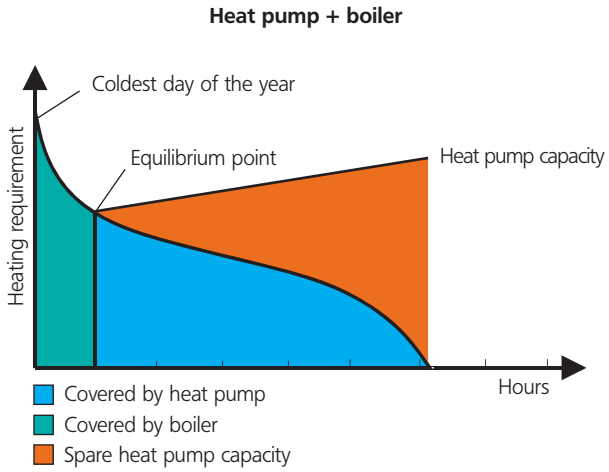
Bivalent systems combine two separate heat sources, the heat pump and a fossil fuel boiler. There are two types of bivalent system: series connected[6] and parallel connected. When series connected the boiler is sized to cover capacity peaks only, in parallel configuration the boiler is sized to cover the full capacity on the coldest day of the year. The parallel bivalent configuration is recommended where a heating system exists. Adding Altherma optimises the energy consumption of the system.





Boiler is only used below the equilibrium point.





6 Where the configuration is the same as a monoenergetic system but with the back up heater replaced by the boiler.

Main specifications

HYDRO-KIT			EKHBH007AC***	EKHBH016AC***	EKHBX007AC***	EKHBX016AC***
Function			Heating only		Heating and Cooling	
For use with			ERYQ005~007	ERYQ011~016	ERYQ005~007	ERYQ011~016
Dimensions	HxWxD	mm	895 x 487 x 361	922 x 502 x 361	936 x 487 x 461	936 x 502 x 361
Leaving water temperature range	heating	°C	25~55			
	cooling	°C	-		5~20	5~22 (with EKHBP)
Drain valve			Yes			
Material			Polyester painted galvanised steel plate			
Colour			RAL9010 (neutral white)			

EKHB*007AC

*** Hydro Kit with Factory Mounted Electric Heater

	Power Supply	Capacity and Steps
EKHBH007AC3V3	230V Single Phase	3kW 1 step
EKHBH007AC6V3	230V Single Phase	6kW 2 step
EKHBH007AC6W1	400V Three Phase and Neutral	6kW 2 step
EKHBH007AC9W1	400V Three Phase and Neutral	9kW 2 step
EKHBH016AA3V3	230V Single Phase	3kW 1 step
EKHBH016AA6V3	230V Single Phase	6kW 2 step
EKHBH016AA6WN	400V Three Phase and Neutral	6kW 2 step
EKHBH016AA9WN	400V Three Phase and Neutral	9kW 2 step
EKHBX007AC3V3	230V Single Phase	3kW 1 step
EKHBX007AC6V3	230V Single Phase	6kW 2 step
EKHBX007AC6W1	400V Three Phase and Neutral	6kW 2 step
EKHBX007AC9W1	400V Three Phase and Neutral	9kW 2 step
EKHBX016AA3V3	230V Single Phase	3kW 1 step
EKHBX016AA6V3	230V Single Phase	6kW 2 step
EKHBX016AA6WN	400V Three Phase and Neutral	6kW 2 step
EKHBX016AA9WN	400V Three Phase and Neutral	9kW 2 step

OPTIONAL DRAIN PAN	EKHBDP		
For cooling operation below 18 °C	-	Standard	Option

INVERTER

ERYQ005AC

OUTDOOR UNIT			ERYQ005AC	ERYQ006AC	ERYQ007AC	ERHQ011AA	ERHQ014AA	ERHQ016AA
Dimensions	HxWxD	mm	735 x 825 x 300			1170 x 900 x 320		
Nominal capacity	heating	kW	5.75	6.84	8.43	11.2	14	16
	cooling	kW	5.12	5.86	6.08	10	12.5	13.1
Nominal input	heating	kW	1.26	1.58	2.08	2.46	3.17	3.83
	cooling	kW	2.16	2.59	2.75	3.6	5.29	5.95
COP			4.56	4.34	4.05	4.55	4.42	4.18
EER			2.37	2.26	2.21	2.78	2.36	2.2
Operation range - Outdoor Temperature	heating	°C	-20 ~ 25			-20 ~ 35		
	cooling	°C	15 ~ 43			10 ~ 46		
	hot water	°C	-20 ~ 43			-20 ~ 43		
Sound pressure level	heating	dBA	48	48	52	49	51	53
	cooling	dBA	47	47	53	50	52	54
Weight		kg	56			103		
Refrigerant charge	R-410A	kg	1.7			3.7		
Power supply			220~240V Single Phase			220~240V Single Phase		
Recommended fuses		A	20			32		
Piping connections	liquid	mm	Flare 6.35			Flare 9.52		
	gas	mm	Flare 15.9			Flare 15.9		
	drain	mm	1 x Hole 18mm			3 x Hole 26mm		

Nominal Capacity and Power Input based on the following conditions: **Heating:** Ambient 7°C db 6°C wb, Leaving Water Temp 35°C (DT 5°C) **Cooling:** Ambient 35°C, Leaving Water Temp 7°C

DOMESTIC HOT WATER TANK		EKSWWU150V3	EKSWWU200V3	EKSWWU300V3	EKSWW150V3	EKSWW200V3	EKSWW300V3
Suitable For		Unvented Systems (EKUSWW kit also required - see below)			Open vent systems		
Pressure / Temp' Relief Valve included		Fitted			Not Supplied		
Water Volume	litres	150	200	300	150	200	300
Max water temperature	°C	85			85		
Height	mm	1015	1265	1715	900	1150	1600
Diameter	mm	580					
Electric Heater	kW	3					
Power supply		220~240V Single Phase					
Material inside Tank		Stainless Steel					
Material outside Tank		Mild Steel					
Colour		Neutral White					
Weight	kg	38	46	60	37	45	59

EKSWW(U)200V3

ACCESSORY KIT FOR UNVENTED SYSTEMS	EKUSWW	Not Applicable
Items Included	1. Combined Pressure Reducing Valve, non return valve, strainer, expansion relief valve 2. Expansion Vessel 3. Primary circuit motorised shut off valve 4. Tundish 5. Draincock	

The Altherma air to water heat pump

The Altherma air to water heat pump is today's answer to the current and future problems associated with conventional heating systems, namely, increasing primary energy costs and an unacceptably high environmental impact.

Benefits of using Altherma

Cost effective alternative to a fossil fuel boiler

Altherma is a comparable alternative to a conventional fossil fuel boiler and optimises the inherently clean, reliable and low maintenance characteristics of heat pump technology.

Low energy bills and low CO_2 emissions

Conventional fuels are becoming scarcer and ever more expensive. As these costs increase, the most attractive renewable source heating system is an 'air to water' heat pump which, by the use of the free heat in the outside air, is at least three times more efficient when compared to a fossil fuel boiler. The result is low primary energy use and no direct CO_2 emissions.

Easy to install

The compact outdoor unit can be located where convenient and requires no drilling or excavation work to collect heat. The indoor hydro-box does not require a dedicated technical room, or additional infrastructure, such as chimneys, fuel tanks or gas connections. Altherma can be connected to industry standard low temperature radiators and underfloor heating systems and can be configured for use in both new and refurbishment applications.

Total solution for year round comfort

Altherma is designed to provide for your sanitary hot water needs all year round and can be selected with a cooling option for the hot summer months. The use of Daikin's advanced inverter technology and variable set-point temperature ensures accurate and stable room temperatures at all times and the lowest possible energy consumption.

altherma

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Daikin Europe N.V. is approved by LRQA for its Quality Management System in accordance with the ISO9001 standard. ISO9001 pertains to quality assurance regarding design, development, manufacturing as well as to services related to the product.

Daikin units comply with the European regulations that guarantee the safety of the product.

ISO14001 assures an effective environmental management system in order to help protect human health and the environment from the potential impact of our activities, products and services and to assist in maintaining and improving the quality of the environment.

Daikin Europe N.V. participates in the Eurovent Certification Programme for Air Conditioners (AC), Liquid Chilling Packages (LCP) and Fan Coil Units (FC); the certified data of certified models are listed in the Eurovent Directory. Multi units are Eurovent certified for combinations up to 2 indoor units.

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