MARKCLIMATE.COM

Specialist in climate control since 1945

GUIDE TO BREEAM

CLIMATE SOLUTIONS FOR SUSTAINABLE BUILDINGS



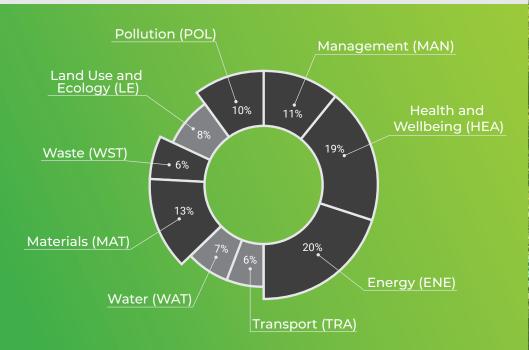




WHAT IS BREEAM?

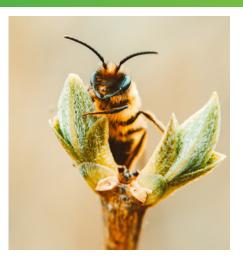
BREEAM-NC (BREEAM International New Construction) is a method to assess and certify the sustainability of a building. BREEAM-NC is divided into 9 main categories (see chart below). Each category is divided into a number of subcategories with their own parameters. If these criteria are met, a certain number of credits can be obtained. In addition, each category has a specific weighting factor. Based on the credits achieved and the weighting factor, a building receives a score from pass (one star) to outstanding (five stars).

The requirements are higher than required by law, making BREEAMrated buildings more sustainable environments that improve the well-being of the people who live and work there, help protect natural resources and make real estate investments more attractive.



The products and associated credits presented in this brochure have been weighted and assessed by independent engineering firm Encon, using the BREEAM-NC guidelines.

WHY BREEAM?



More than just a certification

A BREEAM certification gives an extra dimension to a building. But how come?

Low running costs

Because water and energy consumption (among other things) have been carefully considered before and during construction, you are assured of an energy-efficient building that will benefit you for years to come.

Increased well-being and productivity

Thanks to correctly selected climate control systems, you have invested in an optimal indoor climate. This translates directly to the performance and health of the people who work in the building.

Investment in the future

A BREEAM certificate is also a great marketing tool. By investing in a sustainable building, you are also investing in your corporate image and thus your future. A business that profiles itself as sustainable strengthens its position in the market.

BREEAM-NC qualifications	Stars	% score
Pass	*	≥ 30%
Good	**	≥ 45%
Very good	***	≥ 55%
Excellent	****	≥ 70%
Outstanding	****	≥ 85%



MARK'S SUSTAINABLE MISSION

Mark Climate Technology has been focusing on the climate control of large buildings since 1945. Under the name of "Ingenieursbureau Gebroeders Van der Mark NV", the company started with the production and sale of bending machines and coal-fired air heaters. From the mid-1950s, the Van der Mark brothers increasingly focused on heating large buildings. For this purpose they built hanging gas-fired air heaters themselves. This is how the GS series was created: a unique system that is still leading in the European heating market to this day.

This ingenuity still characterizes Mark. Mark Climate Technology now supplies a leading range in the field of heating, cooling and ventilation. This means that customers can rely on one supplier for their complete climate control system. Mark continues to develop, including in the field of sustainability and circularity. A good example is our Eurovent-certified Mark Airstream heat recovery unit. This appliance with a **heat recovery efficiency of 90%** now ensures optimal air quality in many buildings. With the aid of a heat pump, the appliance can also heat and cool without using natural gas.

In addition to our Airstream heat recovery unit, Mark Climate Technology has 7 other products in the product range that contribute in a sustainable way to a pleasant indoor climate. For certification method BREEAM-NC, the products of Mark Climate Technology can score up to **15 credits** for your sustainability assessment.





The Mark products not only create a pleasant indoor climate, they can also contribute up to 15 credits in your BREEAM assessment. The products mentioned in this brochure, corresponding BREEAM credits and substantiation have been assessed and drawn up by the independent engineering firm Encon.

		max.			MA	NRK P	rodu	cts		
Category	Parameters	credits	Α	в	с	D	Е	F	G	н
Management (MAN)	MAN04 - Commissioning and handover	4	2	2	2	2	2	2	2	2
	HEA02 - Indoor Air Quality	5	2	2	-	-	-	2	2	2
Health & Well- being (HEA)	HEA04 - Thermal comfort	3	2	2	2	2	2	-	-	1
	HEA05 - Acoustic Performan- ce	2	1	1	1	1	1	1	1	-
	ENE01 - Reduction of energy use and carbon	15	2	2	2	2	3	2	2	-
Energy (ENE)	ENE02 - Energy monitoring	2	-	-	-	-	-	-	-	2
	ENE04 - Low carbon design	3	1	1	1	1	1	1	1	1
Materials (MAT)	MAT01 - Life Cycle Impacts	6	1	1	1	1	1	1	1	1
Waste (WST)	WST06 - Functional adaptability	1	1	1	1	1	1	1	1	1
	POL02 - NO _x Emissions	2	2	2	2	2	2	-	-	-
Pollution (POL)	POL05 - Reduction of noise pollution	1	1	1	1	1	1	1	1	-
		TOTAL	15	15	13	13	14	11	11	10
A = Airstream CFX/H	IWX D = Infra (HE) / Infra	a Line		G = N	1DV B	lue				

E = Infra Aqua Design

F = Ecofan W

H = Demand-driven control

MARK BREEAM-PRODUCTS



The Mark AIRSTREAM heat recovery unit is available in various configurations with air flows from 600 - 45,000 m³/h. The unit has an efficiency of up to 90%.



The Mark GS+ is a high efficiency condensing air heater. Due to the extensive capacity range from 13,6 to 142,2 kW, the GS + can be used in many situations.



The Mark TANNER watersupplied suspended air heaters have a wide application range for both industry and utility.



The Mark INFRA (HE) / INFRA LINE is a gas-fired black tube heater that heats with longwave infrared radiation.



Mark INFRA AQUA DESIGN is a water-supplied radiant panel. Due to the short warmup time and the lower room temperature, high energy savings can be realized.



Mark ECOFAN W recirculation fans are recommended together with any air heater. This provides optimal comfort and a good and fast heat distribution in the room.



The MDV BLUE EC roof fan guarantees very low power consumption in combination with excellent performance. Available with air flows from 300 m³/h to 15,000 m³/h.



A high quality unit can only work optimally in combination with an effective control. Mark can provide your building with a demanddriven control.

MANAGEMENT

MAN04 - Commissioning and handover

Aim

Stimulating a good way of commissioning and handover of building and installations, so that optimal operation is guaranteed in the use phase.



Parameters

Commissioning of installations and control systems (1 credit)

At the design stage, a Commissioning Authority has been contracted with the following responsibilities:

- Review of the design and making changes with a view to commissioning;
- Integrate commissioning work into construction planning and during construction work;
- Management of commissioning, testing, handover of the building and aftercare;
- For simple installation concepts, this work can be performed by a commissionings manager.

Testing and inspecting building fabric (1 credit)

Handover (1 credit)

- A user manual has been made available to users and facility managers of the building. A draft version of the manual is discussed with the intended users to best suit their needs.
- At commissioning, training is provided for building users or building managers of the building.

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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	2	2	2	2	2	2	2	2
Suitability	+++	+++	+++	+++	+++	+++	+++	+++





The contribution of Mark Climate Technology

All Mark products come with an extensive technical manual as standard. This manual contains all the information you need to install, commission and maintain the unit.

In addition, Mark Climate Technology has its own service department with extensive experience in the field of service and maintenance. We are authorized to carry out maintenance and inspections on heaters of more than 100kW. Maintaining Mark heaters and keeping them fault-free is therefore perfect for us.

A Mark service technician works from his own region, which means that the travel time can be kept to a minimum, as well as the response time. So if you have a malfunction or want to have maintenance carried out on a Mark heater, you can use our service department.

In addition, our service department can also carry out commissioning or assemble on location for our Mark Airstream heat recovery units.



HEALTH & WELLBEING

HEA02 - Indoor Air Quality

Aim

To recognise & encourage healthy internal environment through the specification & installation of appropriate ventilation, equipment and finishes.

Parameters

Indoor Air Quality (IAQ) plan (1 credit)

Ventilation (1 credit)

- National best practice standard for ventilation
- · Sufficient distance between air intake & exhaust
- CO₂ or air quality sensors

Emissions from building products (1 credit)

Natural ventilation strategy (1 credit)

Indoor air quality measurement (1 credit)

• Measurement by external party in the building





The contribution of Mark Climate Technology

Increasingly high demands are being placed on the air quality in buildings. Multiple ventilation is often needed in order to comply with these demands. A great deal of energy is lost when standard ventilation equipment is used. To counter the loss of energy, Mark has included a heat recovery unit, the AIRSTREAM, in its product range. The unit has an efficiency upto 90%. This means that 90% of the energy expelled is supplied to the fresh intake air. This high-efficiency means that in many cases no after-heating is required.

We distinguish an AIRSTREAM with counter flow plate exchanger (CFX) and heat wheel (HWX). The heat recovery unit is available for both indoor and outdoor installation and can optionally be equipped with pre and post heaters, cooling batteries, heat pumps and indirect adiabatic cooling. The Mark AIRSTREAM is certified according to EUROVENT and RLT Richtlinie-01.

In addition to the Mark AIRSTREAM heat recovery unit, other ventilation solutions are available, such as the MDV BLUE roof fan. We are happy to help you find the perfect solution for your building.



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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	2	2	-	-	-	2	2	2
Suitability	+++	+++	-	-	-	+++	+++	+++

HEALTH & WELLBEING

HEA04 - Thermal comfort

Aim

To ensure that appropriate thermal comfort levels are achieved through design and controls are selected to maintain a thermally comfortable environment for occupants within the building.

Parameters

Thermal modelling (1 credit)

- Analysis of thermal comfort level using *Predicted Mean Vote* (PMV) and *Predicted Percentage of Dissatisfied* (PPD)
- Thermal comfort levels in accordance with European Standard EN ISO 7730:2005

Prepared for climate change (1 credit)

- First credit achieved
- Thermal modelling demonstrates that the relevant requirements are achieved for a projected climate change environment

Thermal zoning and controls (1 credit)

- Zones within the building and how the building services could efficiently and appropriately heat or cool these areas
- Occupant control required for these zones



The contribution of Mark Climate Technology

The products of Mark Climate Technology each provide a pleasant indoor climate in their own way. Each product also has its own application.

Mark's consultants can use an energy analysis or a transmission loss calculation to show exactly which system is most appropriate for your project. We guarantee that our advice leads to the desired temperature in your building.

If you combine Mark's products with a demanddriven control, the indoor climate will be optimized even further. Consider, for example, a regulation based on CO_2 , presence, moisture and temperature.



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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	2	2	2	2	2	-	-	1
Suitability	+++	+++	+++	+++	+++	-	-	+++

HEA05 - Acoustic Performance

Aim

To ensure the building's acoustic performance, including sound insulation meets the appropriate standards for its purpose.

Parameters

A suitably qualified acoustician is appointed by the client at the appropriate stage in the procurement process (1 credit)

Indoor ambient noise and sound insulation (1 credit)

- All unoccupied spaces comply with the indoor ambient noise level targets
- A SQA carries out ambient noise measurements
- The sound insulation complies with the privacy index

Reverberation times (1 credit)



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Product	AIR- STREAM	CS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	1	1	1	1	1	1	1	-
Suitability	+++	+++	+++	+++	+++	+++	+++	-





The contribution of Mark Climate Technology

The acoustics in a building determine its quality of life. We take this into account when developing our products. Take our radiant heating systems, for example. Mark Climate Technology has a series of gas-fired radiators (Infra / Infra Line) and a series of water-supplied radiant panels (Infra Aqua Design).

Our radiant heaters are equipped with a tube register that is heated by the heat medium. As a result, the tube will give off its heat in the form of radiant heat. This heat can best be compared to the sun. The radiant heat is completely harmless and gives a very comfortable feeling.

There is no use of fans or other moving parts, so no air is blown into the room. Therfor people inside will not be bothered by air displacement or dust swirls. In addition, the radiant heaters work completely silently.

The Mark Infra Aqua Design radiant panels can optionally be supplied in a perforated version for optimal room damping.



ENERGY

ENE01 - Reduction of energy use and carbon

Aim

To recognise and encourage buildings that minimize their operational energy consumption through good design



Parameters

Defining the building energy performance using building energy calculation software

- · Assessed building compared to notional equivalent
- Notional building = local regulations or ASHRAE Standard (if local regulations are less rigorous)
- · Minimum 6 credits needed for excellent rating
- Minimum 10 credits needed for outstanding rating

Energy modelling study & qualified engineer required

- Modelling software = National Calculation Methodology or BRE approved (country-specific)
- Approved software: Designbuilder, TRNSYS, EPB-Software 3G

(15 credits)

The contribution of Mark Climate Technology

Our advisors are happy to help you use energy as efficiently as possible.

Mark's warranty system is just a bit smarter than that of most suppliers. It is precisely tailored to the wishes of the customer. After all, you don't want a climate control system, you want your building to have a certain temperature and air quality. And Mark gives a guarantee on that.

Would you like to meet us? In a non-binding advice, we look at the perfect solution for climate control for you. We are happy to come to your project for this. Mark's consultants can use an energy analysis or a transmission loss calculation to show exactly which system is most appropriate for your project. We guarantee that our advice leads to the desired temperature in your building. That's Mark's assurance.



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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	2	2	2	2	3	2	2	-
Suitability	+++	+++	+++	+++	+++	+++	+++	-

ENE02 - Energy monitoring

Aim

To recognise and encourage the installation of energy submetering that facilitates the monitoring of operational energy consumption.

Parameters

Sub-metering of major energy-consuming systems (1 credit)

- Track annual energy consumption
- Energy monitoring & management system or pulsed energy sub-meters

Sub-metering of high energy load and tenancy areas (1 credit)

- Sub-metering per floor
- Energy monitoring & management system or pulsed energy sub-meters



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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	-	-	-	-	-	-	-	2
Suitability	-	-	-	-	-	-	-	+++





The contribution of Mark Climate Technology

Devices can be regulated and controlled in various ways. Each individual will have his own ideas and requirements. Mark has thus developed a range of options from standard to projectspecific.

Our range includes various types of thermostats, speed controllers, packaged digital controllers and full custom made power and control panels, enabling the user to control a single unit or multiple units. Much is also possible with regard to the applied scheme. For example on the basis of a day and night room temperature monitoring or on room and inlet temperature.

New in our range are the thermostats and controllers controlled via Internet (web-based). This allows remote connection with the thermostat via a web browser or mobile app. For example, you can operate the thermostat anywhere in the world with a telephone, tablet or laptop / PC.

Mark has its own electrical engineering and manufacturing department and is therefore able to offer a solution for any control requirement. Our engineers would be pleased to advise you. Simply contact them to discuss the options within our range of control equipment.

ENE04 - Low carbon design

Aim

To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimize reliance on active building services systems

Parameters

Passive design analysis (1 credit)

- Analysis of the proposed building site identification of opportunities for the implementation of passive design solutions that reduce building energy demand.
- The building uses passive design measures to reduce the overall building energy demand, primary energy consumption or $\rm CO_2$ emissions by at least 5%.

Free cooling (1 credit)

Low zero carbon feasibility study (1 credit)

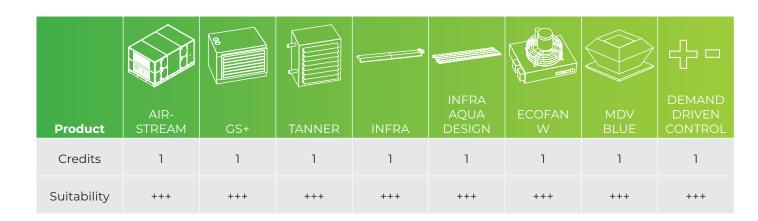


The contribution of Mark Climate Technology

In the early design phase of a building, it is up to the design team to think carefully about passive design techniques. Mark Climate Technology is happy to work with you to see how Mark's products fit into this passive design.

Various questions can be addressed here. How do you want to heat? Gas-fired or gasless? Do you want to install the climate control systems in the building itself or do you want them placed in a separate boiler room or on the roof? Do you also want to be able to cool the building? Naturally, the energy efficiency of our products also plays a major role in this.

Together with you, we want to come up with a suitable proposal for the climate control of your building.





MATERIALS MAT01 - Life Cycle Impacts

Aim

To recognise & encourage the use of robust appropriate life cycle assessment tools & specification of materials with low environmental impact over full building life cycle.



Parameters

Measuring the life cycle environmental impact of building elements (5 credits)

- Building fabric, services & landscaping
- Evaluating a range of material options for the building with a Life Cycle Assessment (LCA) tool. BREEAM MAT1 Calculator required

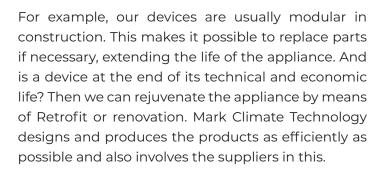
EPD - Environmental product declarations (1 credit)

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Product	AIR- STREAM	CS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	1	1	1	1	1	1	1	1
Suitability	+++	+++	+++	+++	+++	+++	+++	+++





Circularity is one of the spearheads of our company. Mark Climate Technology thinks carefully about what ecological footprint Mark's products leave behind. Already during the design, consideration is given to how the products and / or raw materials thereof can be reused and how loss of value can be minimized.



Mark consciously chooses materials with a low environmental impact for its products. Many of our products consist largely of steel; this is completely recyclable.

We also try to create as little waste as possible when transporting our appliances. No unnecessary boxes or plastic packaging are used. In addition, the devices are shipped on FSC certified wooden pallets.



WASTE

WST06 - Functional adaptability



To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan.

Parameters

Functional adaptability (1 credit)

- A building-specific functional adaptation strategy study
- Functional adaptation measures have been implemented in the design



The contribution of Mark Climate Technology

A building must be flexible. That is to say, when a building is given a different type of use, it is important that unnecessary waste is avoided.

The products of Mark Climate Technology are ideal for the flexibility of your building. They can be easily moved or removed if necessary.

In addition, we can configure the units differently, so that everything perfectly matches the new situation. Naturally, other components can also be mounted in our heat recovery units.



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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	1	1	1	1	1	1	1	1
Suitability	+++	+++	+++	+++	+++	+++	+++	+++

POL02 - NO_x Emissions

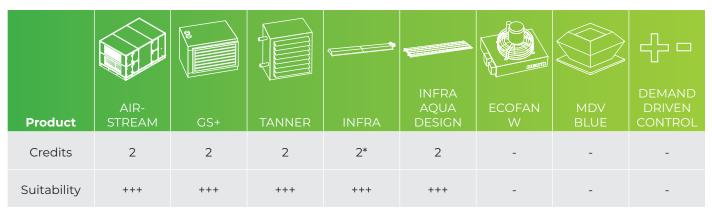
Aim

To contribute to a reduction in national NOx emission levels using low emission heat sources in the building.



NOx-emissions for heating and hot water demand (2 credits)

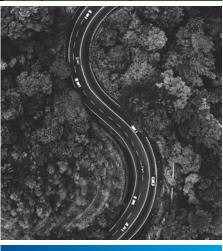
NOx emission level all building types	No. of credits
≤ 56 mg/kWh	1 credit
≤ 40 mg/kWh	2 credits
NOx emission level industrial building types	No. of credits
	No. of credits 1 credit



* Infra HE











The contribution of Mark Climate Technology

Nitrogen (N_2) is a colorless and odorless gas that is all around us. About 78% of all air consists of nitrogen. Nitrogen itself is not harmful to humans and the environment. But there are also compounds of nitrogen in the air that can be harmful to humans and the environment. These are nitrogen oxides (NO_x, a compound of nitrogen and oxygen) and ammonia (NH₃, a compound of nitrogen and hydrogen). The amount of nitrogen oxides and ammonia in the air is called the concentration.

Nitrogen oxides (NO_x) are mainly released into the air through exhaust fumes from traffic and emissions from industry. But also, for example, by gas-fired air heaters.

Mark Climate Technology has developed its products in such a way that nitrogen emissions are minimal. For example, our GS+ has a NO_x emission of less than 35 mg/kWh.

Do you want a pleasant indoor climate, but no nitrogen emissions? Then choose our water-fed appliances (Tanner MDA/MBA and Infra Aqua Design) or our Airstream heat recovery unit.

POLLUTION

POL05 - Reduction of noise pollution

Aim

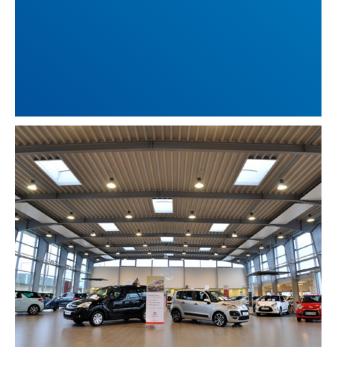
To reduce the likelihood of noise, arising from fixed installations on the new development, affecting nearby noise sensitive buildings.

Parameters

- Sufficiently low external noise levels
- Remedial works if necessary
- Noise impact study by qualified acoustician required

Remark: no noise sensitive buildings in the vicinity? Then the credit is automatically awarded.

(1 credit)



The contribution of Mark Climate Technology

Not only for the building itself, but also for the surrounding buildings, it is important that the risk of noise pollution is reduced as much as possible.

The Mark Climate Technology products have been developed in such a way that the noise level is low enough, both inside and outside the building, for the quality of life to be as optimal as possible.

This is possible thanks to the use of silencers. You can also think of demand-controlled ventilation, so that a heat recovery unit runs at the lowest possible speed.

Provisions can also be made on the building to shield the noise. We also strive to design a project solution as favorable as possible when it comes to noise pollution.



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Product	AIR- STREAM	GS+	TANNER	INFRA	INFRA AQUA DESIGN	ECOFAN W	MDV BLUE	DEMAND DRIVEN CONTROL
Credits	1	1	1	1	1	1	1	-
Suitability	+++	+++	+++	+++	+++	+++	+++	-



DC ZEEWOLDE

A pleasant indoor climate for new distribution center in Zeewolde

On behalf of vanPanhuis in Hoogeveen (NL), Mark Climate Technology supplied the climate systems for the newly built distribution center in Zeewolde. The building of approximately 18,000 m² has received the BREEAM rating VERY GOOD (***).

Four GS+ high efficiency gas-fired air heaters provide the distribution halls with heating. This condensing unit provides an efficiency greater than 106% (lower value). Heat is generated via a modulating (5:1) premixburner which results in very low gas consumption.

Ten pieces of ECOFAN W recirculation fans have been installed in combination with the high

efficiency air heaters. A combination of these products provides optimum comfort and good heat distribution within the room. The ECOFAN W transports the warm blanket under the roof to the occupied area. As a result, the room heats up more quickly, and gas consumption can in some cases be reduced by up to 30%.

Two Mark AIRSTREAM HWX heat recovery units placed on the roof provide the heat recovery and ventilation of the office spaces. This Euroventcertified AIRSTREAM heat recovery unit fully complies to the latest requirements of the ErP regulation for ventilation products. The units are also supplied Plug & Play as standard.





AIRSTRE D t The products and associated credits presented in this brochure have been weighted and assessed by independent engineering firm Encon, using the BREEAM-NC guidelines.

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A PLEASANT INDOOR CLIMATE

Mark Climate Technology is happy to advise you on a pleasant indoor climate for your building. With free advice (also on site) and a wide product range, we can provide each customer with a tailor-made service.



