

# jaga

CLIMATE DESIGNERS

Heating



Light cooling



Deep cooling



JAGA FOR SUSTAINABLE BUILDINGS





# THE MOST ECOLOGICAL SYSTEMS

Jaga is a pioneer in ecological Low-H<sub>2</sub>O coils for low water temperatures and dynamic systems. This both for heating and for passive and active cooling systems. Jaga has already been able to contribute to numerous leading ecological BREEAM, LEED or DGNB certified buildings. Our solutions can also be an important building block in your pursuit of a better environmental score



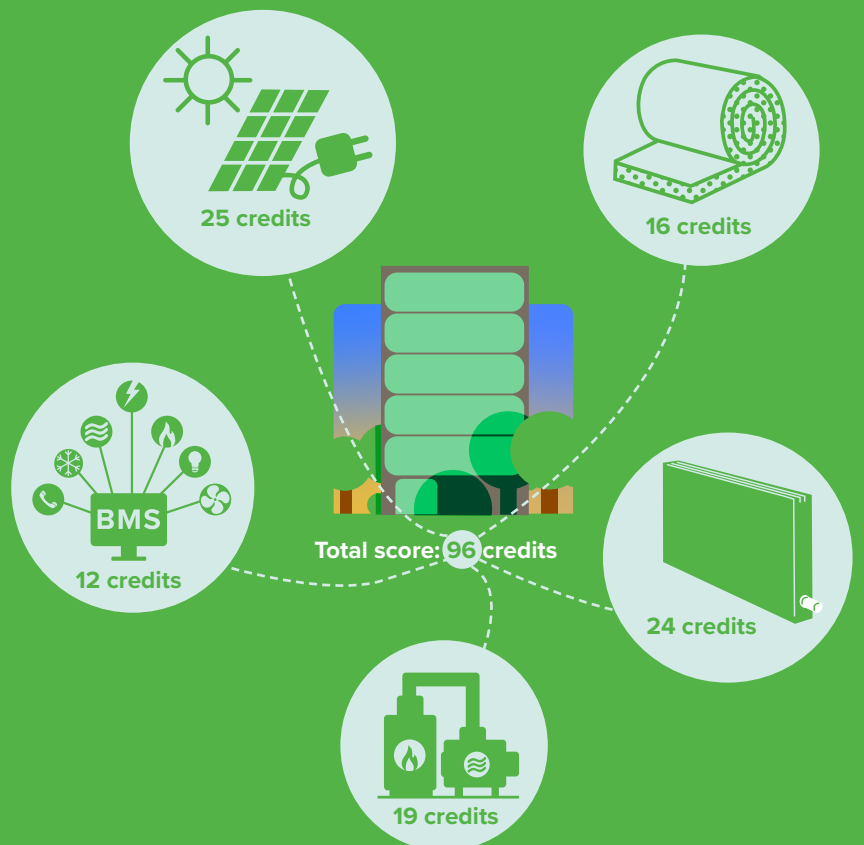




# BREEAM & JAGA

**BREEAM is the world's leading sustainability assessment method for masterplanning projects, infrastructure and buildings. BREEAM is a registered trademark. It recognises and reflects the value in higher performing assets across the built environment lifecycle, from new construction to in-use and refurbishment.**

Just as BREEAM pushes the envelope of quantifying sustainability and creating awareness of possibilities for infrastructure and buildings. Jaga strives towards innovation while focussing on the importance of durability. Creating better, more efficient and sustainable systems is the main focus point for Jaga. The analysis shows that their systems align with loads of BREEAM topics from energy consumption, indoor climate, dealing with materials to reduction of waste and pollution.



Different building products can add value to the bream score due to their unique properties. By combining that, your overall score of project will increase.

# OVERVIEW BREEAM CREDITS

Jaga can contribute up to **25 credits** for BREEAM International New Construction certificate, which increases the value of the building. Analysed by Encon, an independent assessor organisation.

## 10 CATEGORIES FOR CREDITS ACCORDING TO BREEAM:

		max. credits	Jaga potential
	<b>MANAGEMENT</b>		
	MAN 04 Commissioning and handover	4	2
	<b>HEALTH &amp; WELLBEING</b>		
	HEA 02 Indoor Air Quality	5	2
	HEA 04 Thermal comfort	3	3
	HEA 05 Acoustic Performance	2	1
	<b>ENERGY</b>		
	ENE 01 Reduction of energy use and carbon	15	3
	ENE 02 Energy monitoring	2	2
	ENE 04 Low carbon design	3	2
	<b>TRANSPORT</b>		
	<b>WATER</b>		
	<b>MATERIALS</b>		
	MAT 01 Life Cycle Impacts	6	1
	MAT 06 Material efficiency	1	1
	<b>WASTE</b>		
	WST 05 Adaptation to climate change	1	1
	WST 06 Functional adaptability	1	1
	<b>LAND USE &amp; ECOLOGY</b>		
	<b>POLLUTION</b>		
	POL 01 Impact of Refrigerants	4	3
	POL 02 NOx Emissions	2	2
	POL 05 Reduction of noise pollution	1	1
	<b>INNOVATION</b>		





## MANAGEMENT

### MAN 04: COMMISSIONING AND HANDOVER

**AIM:** To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants.

**Parameters:**

#### ***Commissioning building services (1 credit)***

- For buildings with complex building services and systems, a specialist commissioning manager is appointed.
- For simple building services, this role can be carried out by an appropriate project team member.

#### ***Handover (1 credit)***

- A building or home user guide is developed
- A training schedule is prepared for building occupiers
- The design intent of the building
- The available aftercare team Introduction to, and demonstration of, installed systems
- Introduction to the building user guide
- Maintenance requirements, including any maintenance contracts and regimes in place

**Jaga systems perform as intended. Jaga has extensive and comprehensive manuals for installation and usage that is available to the facilities manager and user.**





## HEALTH & WELLBEING

### HEA 02: INDOOR AIR QUALITY

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

**Parameters:**

**Indoor air quality plan (1 credit)**

- An indoor air quality plan has been produced and implemented. It considers the removal of contaminant sources, dilution and control of contaminant sources, procedures for pre-occupancy flush out, third party testing and analysis, maintaining indoor air quality in-use.

**Ventilation (1 credit)**

- The building has been designed to minimize the indoor concentration and recirculation of pollutants according to national best practice standard for ventilation.
- Some focus points include sufficient distance between air intake & exhaust and CO2 or air quality sensors.

**Jaga systems help maintain the indoor air quality in-use. Coupled with the entire HVAC system or by taking air from outside, the systems will also ensure a good ventilation. Jaga's decentralized ventilation system OXYGEN can work independently and in a controlled balance with extraction, based on integrated CO2 and RH measurements.**

### HEA 04: 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) & Predicted Percentage of Dissatisfied (PPD).
- Thermal comfort levels (air-conditioned buildings) in accordance with European Standard EN ISO 7730:2005.

**Adaptability for a projected climate change scenario (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)**

- First credit achieved.
- Zones within the building and how the building services could efficiently and appropriately heat or cool these areas.
- The degree of occupant control required for these zones.

**Jaga systems have precise control over thermal comfort levels in seasonal variations and even for a projected climate change. Due to their compact design, they heat up a lot faster than regular heaters ensuring a fast change in thermal comfort. Furthermore, the Jaga systems can deliver different services depending on the requirements for the building (heating/cooling certain areas more than others). There is a possibility for the building occupants to have control over a certain degree of the temperature via thermostats.**

### HEA 05: ACOUSTIC PERFORMANCE

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

**Parameters:**

**Indoor ambient noise and sound insulation (1 credit)**

- All unoccupied spaces comply with the national building regulations or good practice standards concerning indoor ambient noise level.
- A SQA carries out ambient noise measurements to ensure that the relevant spaces achieve the required levels.
- The sound insulation between acoustically sensitive rooms and other occupied areas comply with the privacy index.

**Jaga's devices have been measured according to ISO3741 at independent accredited laboratories. The published sound pressure levels take into account an attenuation of 8 dB (A) compared to the measured ISO3741 sound power levels because of a presumed room volume of 100 m<sup>3</sup> and a reverberation time of 0.5 seconds, at 2 meter distance from the device. Jaga devices can therefore be dimensioned in an inaudibly quiet operation. (F.E. lower than 30 dB(A) sound pressure level) The detailed ISO3741 sound power measurements in 10 octave bands can be handed over at the request of the customer.**



## ENERGY

### ENE 01: REDUCTION OF ENERGY USE AND CARBON

**AIM:** To recognise and encourage buildings that minimize their operational energy consumption through good design.

**Parameters:**

**Energy modelling study & qualified engineer required (3 credit)**

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

**Jaga systems are very energy efficient according to a study from TU Eindhoven, Kiwa and a BRE report. Installing Jaga systems will help in achieving credits towards energy reduction.**

*\*According to a study from BRE (2003): Saving of 15% in mild weather and 10% in winter season.*

### ENE 02: ENERGY MONITORING

**AIM:** To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.

**Parameters:**

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

- Energy metering systems are installed to track annual energy consumption.
- Energy monitoring & management system or pulsed energy sub-meters.

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

- Energy metering systems are installed to allow sub-metering per floor.
- Energy monitoring & management system or pulsed energy sub-meters.

**Energy consumption of Jaga systems can be monitored, either on system level or on floor level. The products have a low energy consumption, but Briza 22 is often used as a main source of heating/cooling. Therefore, it has the highest impact on the total energy consumption of the HVAC system.**

### ENE 04: 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 CO<sub>2</sub> emissions by at least 5%.

**Free cooling (1 credit)**

- First credit achieved.
- Execute a free cooling analysis and identify opportunities for implementation.
- Examples include night time cooling, natural ventilation, ground coupled air cooling, ground water cooling, ...

**Jaga systems help in reducing the overall building energy demand for heating, ventilation and cooling. Especially with the non condensing “Jaga Light Cooling” systems.**





## MATERIALS

### MAT 01: 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***

- Evaluating a range of material options for the building with a Life Cycle Assessment (LCA) tool.
- The scope of the LCA includes the building fabric, building services & landscaping Determine the score by using the BREEAM International Mat 01 calculator.

**Jaga systems have an influence on the environmental impact of building elements. Their compact design requires less materials, they have a long lifespan and can be recycled at the end. By including the systems in the BREEAM scope, Jaga helps in achieving credits. Previously the Ecolizer 2.0 of OVAM has been used to measure an LCA score.**

### MAT 06: MATERIAL EFFICIENCY

**AIM:** To recognise and encourage measures to optimise material efficiency in order to minimise the environmental impact of material use and waste without compromising on structural stability, durability or service life of the building.

**Parameters:**

***Material efficiency (1 credit)***

- The design team identifies opportunities and implements measures to optimise use of materials in design, procurement, construction, maintenance and end of life.

**The Jaga systems are very material efficient. They are lighter and smaller than traditional heaters but still have the same power. These systems have a long lifespan and can be recycled, further contributing to the efficient use of materials. Furthermore, Jaga has a 30 year guaranty on the heat exchangers in their system where the hydronic water complies with VDI2035.**





## WASTE

### WST 05: ADAPTATION TO CLIMATE CHANGE

**AIM:** To recognise and encourage measures taken to mitigate the impact of extreme weather conditions arising from climate change over the lifespan of the building.

**Parameters:**

***Adaptation to climate change – structural and fabric resilience (1 credit)***

- Carry out a systematic risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts.

Jaga systems are very responsive and reliable, ensuring a comfortable indoor climate that can adapt to climate change. This fast heating/cooling capacity is made possible due to the compact design and the Low-H<sub>2</sub>O technology. The low mass and low water content of Jaga units, in combination with the instantly adjustable fan speed, ensures that there is virtually no inertia in the energy transfer. Jaga's appliances can follow exactly the heating or cooling demand, provided that an adequate control system is used. This avoids overheating, a characteristic of high inertia systems.

### WST 06: FUNCTIONAL ADAPTABILITY

**AIM:** 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 has been undertaken by the design team which includes recommendations for measures to be incorporated to facilitate future adaptation.

- These functional adaptation measures have been implemented in the design where practical and cost effective.

Jaga systems are easy to install due to their compact design. Jaga systems can be installed in different locations (wall/floor/ceiling) depending the need and/or functionality of the room.





## POLLUTION

### POL 01: IMPACT OF REFRIGERANTS

**AIM:** To reduce the level of greenhouse gas emissions arising from the leakage of refrigerants used to heat or cool the building.

**Parameters:**

***Ozone depleting potential (1 credit)***

- The refrigerants used must have an ODP of 0.
- Impact of refrigerants (2 credits OR 1 credit)
- The direct effect life cycle CO<sub>2</sub> equivalent emissions (DELCO) of ≤100 CO<sub>2</sub>-eq/kW. For systems which provide cooling and heating, the worst performing output based on the lower of kW cooling output and kW heating output is used to complete the calculation.
- Refrigerants have a Global Warming potential (GWP) ≤ 10. OR
- The direct effect life cycle CO<sub>2</sub> equivalent emissions (DELCO) of ≤1000 CO<sub>2</sub>-eq/kW.

**Jaga systems use water as a coolant. Both the ODP and the GWP of water comply with the BREEAM criteria. Furthermore, the systems use a very small amount of water.**

### POL 02: NOX EMISSIONS

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

**Parameters:**

***Heating and hot water demand (2 credits)***

- NOx emission level all building types
- NOx emission level industrial building types

**Jaga systems heat up quicker and on lower temperatures than regular heaters but still have the same power. Jaga systems are powered by electricity, which BREEAM favors over other conventional ways of heating. The efficiency of energy transfer in Jaga's devices enables low temperature heating and high temperature cooling. Therefore a heat pump can be used as an energy source. It uses electricity instead of fossil fuels.**

### POL 05: REDUCTION OF NOISE POLLUTION

**AIM:** To reduce the likelihood of noise, arising from fixed installations on the new development, affecting near by noise sensitive buildings.

**Parameters:**

***Reduction of noise pollution (1 credit)***

- No noise sensitive buildings in the vicinity (800m).
- OR
- Noise impact assessment in accordance with the ISO 1996 series.
- The assessment is carried out by a qualified acoustician. The noise level from the proposed site or building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.
- Remedial works if noise sources from the assessed building are greater than the levels according to BREEAM.

**Jaga systems are installed inside the building. They will not cause any noise towards the nearby buildings.**

# BECOME A JAGA CLIMATE DESIGNER

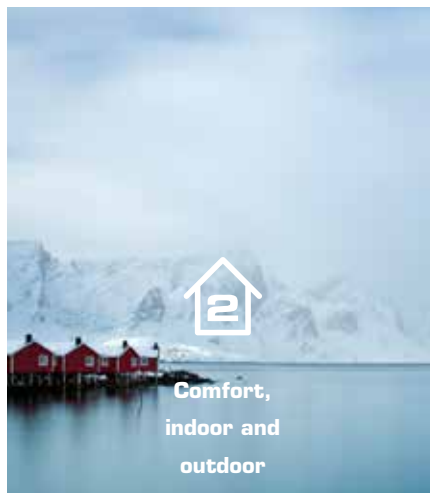
*"CLIMATE CHANGE AND EVOLUTION OF CONSTRUCTION TECHNIQUES DEMAND NEW ECOLOGICAL SOLUTIONS FOR HEATING, COOLING AND VENTILATION."*

Climate change and evolution of construction techniques demand new ecological solutions for heating, cooling and ventilation.

New technologies have to consume far less energy. They have to insure a better indoor climate without damaging the outdoor climate. Traditional systems with fire and carbon emissions have to be extinguished. We have to evolve towards a green flame and build a sustainable path towards a better future. Choosing the sustainable path is no longer a matter of choice, it's an obligation.

Always honouring its values, Jaga Climate Designers continually look for the most ecological solutions for heating, cooling and ventilation.

**Join us and become a Jaga Climate Designer ambassador.**



**jaga**  
CLIMATE  
DESIGNERS

Jaga N.V.  
Verbindingslaan 16  
B-3590 Diepenbeek  
Tel.: +32 (0)11 29 41 12  
Fax: +32 (0)11 32 35 78  
E-mail: [orders@jaga.be](mailto:orders@jaga.be)