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AWA – Modula Technology – Technical and General Cooperation Info

General Info on Technology

Scarcity, lack of safety, and pollution related to water are global issues that affect about one-third of the world's population, as estimated by the World Health Organization (WHO). Traditional water sources are facing depletion and pollution, as stated in the United Nations World Water Development Report 20 and in the Climate Change and Land special report by the Intergovernmental Panel on Climate Change (IPCC).

In addition to better water management, accessible new fresh water sources are also needed. Thus, lately, air-to-water generator (AWG) technology research has been advancing quickly as these systems permit to extract water vapour from the air, which can be considered as an alternative water source.

The most diffused AWG systems are based on a compression reverse cycle and their main issue is energy consumption. In order to address such an issue, and provide water from air with an acceptable energy consumption, in the last few years, advanced models of compression reverse cycle AWGs have been developed, implementing the integrated systems approach.

This approach consists in designing systems and/or plants that are able to provide more than one useful effect at the same time while using the same energy input. In such a way, it would be possible to exploit energy in the best way, minimizing or reusing waste products, thus minimizing energy consumption

The advantages given by an integrated system and an integrated design approach do not only consist in higher efficiency in the energy use, but also in the minimization in the use of raw materials. In fact, for example, if two useful effects can be achieved by the same machine, there will be one less machine to be built.

Smart Cities, and in particular **Smart Buildings**, are strongly based on this idea of integration. At the city scale, one of the most diffused and prominent examples of such an approach is thermoelectric generation coupled with district heating.

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As for AWG technology, a first design of an integrated system able to provide water and air conditioning can be found on 2007, where the energy used for air conditioning permits the possibility of extracting water from air at the same time. A comparison with a traditional air-conditioning plant, with the same cooling effect, demonstrated that the water production, by means of the innovative plant, was almost cost free.

In 2010, the term “integrated systems” was particularly applied to AWG machines designed to be easily integrated into buildings and that are able to exploit at least one of the other useful effects of a reverse cycle, in addition to water generation, in order to cover a part, or the entirety, of heating ventilation air conditioning (HVAC) needs.

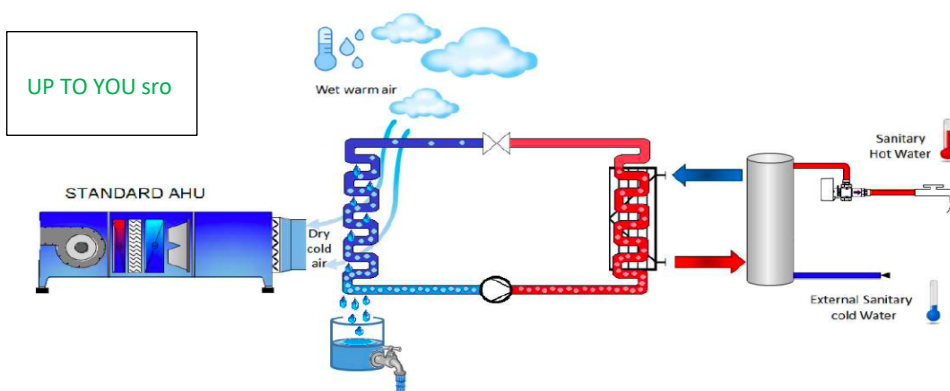
In the quoted research, an AWG-integrated system was designed and built to cover the entire drinking water needs of a hotel in Villahermosa, Mexico, as well as all the heating energy required by the domestic water.

The system was also connectable to an existing air treatment unit (ATU) in order to help it with the fresh and dry air flux (averagely of 8500 m³/h) coming from the evaporator. In this case, the innovative plant yielded a meaningful energy saving, in comparison to the existing system, while providing enough water.

Savings were enough to repay the investment costs in about two-and-a-half years. This integration improvement was demonstrated by calculations based on the energy consumption measures obtained before and after the installation of the integrated AWG system.

AWA's – Technical Data

We cool down air by means of an application of the compressor reverse cycle, commonly known as “fridge cycle”.





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AWA – Water Treatment Configuration

- **BASIC** Purified water, suitable for: irrigation, washing, industrial purposes, zoo technical uses, etc
- **DRINKABLE** Perfectly Pure and Tasty drinkable water for Superior Quality human consumption. The custom mineralization, PREMIUM, can provide special taste and water features.
- **MINERAL FREE** Distilled water (2MΩ of resistivity) suitable for both industrial and particular alimentary uses.
- **MINERAL FREE PLUS** High profile and quality distilled water (over 15 MΩ of resistivity). The product is a very high quality tech water suitable for H2 chains, cosmetic, pharmaceutical, electronic industrial uses and also for special food&beverage productions.

AWA – Drinkable “PREMIUM”

Calcium, Na, K, Cl, Mg, Fe, Zn, Cu, Cr, I, Co, Mo and Se are essential for human health, as defined by the World Health Organization and the Food and Agriculture Organization (WHO/FAO). For these elements, water may provide up to 20% of the required total daily intake.

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In AWA DRINKABLE PREMIUM we can find all the substances and elements of a typical best mineral water, such as magnesium, calcium, potassium, sodium, sulphates, carbonates, bicarbonates, chlorides and many other important elements in traces.

Chemical and Microbiological Laboratories, internationally acknowledged, guarantee the chemical and microbiological compliance with laws and rules of AWA DRINKABLE PREMIUM system, and above all, the respect of nutritional elements added.

Furthermore, for particular tastes and beverage requests, it is also possible to change the mineralization doses to customize the taste. Moreover, probes verify, in real time, every part of the water treatment unit (in compliance with any ISO quality system and in accordance with HACCP* rules) to ensure the maximum security and quality in bottling system too.

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AWA – Water Chemical And Biological Tests

After final tests, we also carried out other tests on site, considering many other parameters, in order to guarantee the conformity to local laws and to the final use of the system.

We already have certificates for the following countries:

- ⇒ Switzerland
- ⇒ Italy
- ⇒ UAE
- ⇒ Mexico
- ⇒ Perù

It is important to highlight that European Country law limits, about water, are among the strictest in the world

AWA – Sustainability

- AWA water generation systems do not use local water sources and does not affect them with pollution or brine.
- Environmental air humidity provides an almost unlimited source of clean drinking water which does not affect the global/local ecosystem
- AWA water treatment units can provide a source of safe and healthy water which is one of the most important means to preserve health in a community
- AWA systems can be connected to solar cells, wind farms and any other renewable energy source to achieve zero carbon footprint.
- The use of only 30% of the thermal energy produced by an AWA 1000 reduces CO2 yearly emissions by over 280 tons.
- AWA systems can provide a fresh & dry airflux and an heat source

AWA Modula

AWA MODULA systems are built on standard industrial modular basis.

AWA range is available in modular models, capable of producing 250, 500, 1000, 1500, 2500, 5000 or 10000 litres of water per day (at 30°C ,70% R.H.)

AWAs MODULA, in the HWAC configuration, produces also

1. Drinking Water
2. Domestic Water heating (up to 50°C)
3. Primary fresh air (24°C, 40% R.H.)
4. Water cooling (7°C)

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AWAs MODULA working range:

STANDARD configuration: 5°C, 90% R.H. / 50°C, 10% R.H.

DESERT configuration: -2°C, 90% R.H. / 50°C, 10% R.H.

AWA MODULA 25 - 50 - 100 - Performances

AWA 25

- Power Supply: 220 V 50Hz 1Ph 16 A (3,0 kW)
- Size (WxDxH): 2205x880x1870 mm
- Available Heating thermal power (water): 11 kW 270 Litres/hour at 50°C
- Available Cooling thermal power (Air): 1150 mc/h at 24°C 40% R.H.

AWA 50

- Power Supply: 380 V 50Hz 3Ph (6,0 kW)
- Size (WxDxH): 2205x950x1870 mm
- Available Heating thermal power (water): 22 kW 540 Litres/hour at 50°C
- Available Cooling thermal power (Air): 2300 mc/h at 24°C 40% R.H.

AWA 100

- Power Supply: 380 V 50Hz 3Ph (12,0 kW)
- Size (WxDxH): 2205x1450x1870 mm
- Available Heating thermal power (water): 44 kW 1080 Litres/hour at 50°C
- Available Cooling thermal power (Air): 4600 mc/h at 24°C 40% R.H.

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