

zudek∞

English



After years of testing, research and curiosity, there is airmatik®:

air-cooled ammonia chiller with aluminium microchannels, efficient reliable and compact.

airmatik®:

a little bit of history

an interview with Alessandro Zudek

How was the Airmatik developed?

Why did you invent these air-cooled machines?

Because we saw a wide variety of air-cooled chillers in the refrigeration world, but only for the freon market.

We make ammonia refrigeration units, so we said, 'Let's design an air-cooled chiller with all the features of the plug-in machines and the advantages of the industrial ammonia systems.'

How did you begin?

From refrigerant condensers: they are the focal point for this kind of chiller.

The market standard is the air exchanger with steel tubes and aluminium fins.

But they are only moderate performers, bulky and they need lots of ammonia in the refrigeration circuit.

You started with a car, didn't you?

Yes, the automotive field uses heat exchangers with aluminium microchannels to reduce the size of radiators and increase their efficiency.

Then what happened?

At a meeting in 2004, professor Furio Honsell, a mathematician and Dean of the University of Udine, told me that there was research funded by the European Union on aluminium microchannels for the industrial refrigeration sector. It was the perfect opportunity, so we joined in. The studies were done in the Netherlands. To get as much experience as possible, we also volunteered for an experiment. In our facility in Trieste, we built a prototype that, based on the research programme, worked with a synthetic refrigerant.

What about the ammonia?

I was interested applying this technology to our machines, but the project ended early: we were not able to test the condensers the way we wanted to.

We still had the case histories of the tests performed and the studies that highlighted the product's compatibility with ammonia.

Ah, that was it!

Yes, we continued on our own and looked for a partnership with suppliers of microchannel heat exchangers for the automotive world.

We teamed up with a Spanish firm that made replacement parts for cars.

We continued working with them until we created the first prototype. Over time, we improved it by building the entire ventilation system and considering a reduction in electricity usage to be a priority.

Did that take a long time?

After two years of work, we built the first package with microchannels and dedicated axial fans.

These fans aren't used a lot in cooling, but they came from industrial refrigeration, where they got great results. They have a large diameter and work at low speeds: perfect for quiet operation and low electricity consumption.

This was the final stage, wasn't it?

Once we had these two parts, we began to design the actual machine.

We designed the machine with these objectives:

- 1) to be easy to transport with a container, anywhere in the world
- 2) to have the greatest efficiency and dependability
- 3) to include our remote-control Telematik system

At this point, the **Airmatik®** was born.



What features does the machine have?

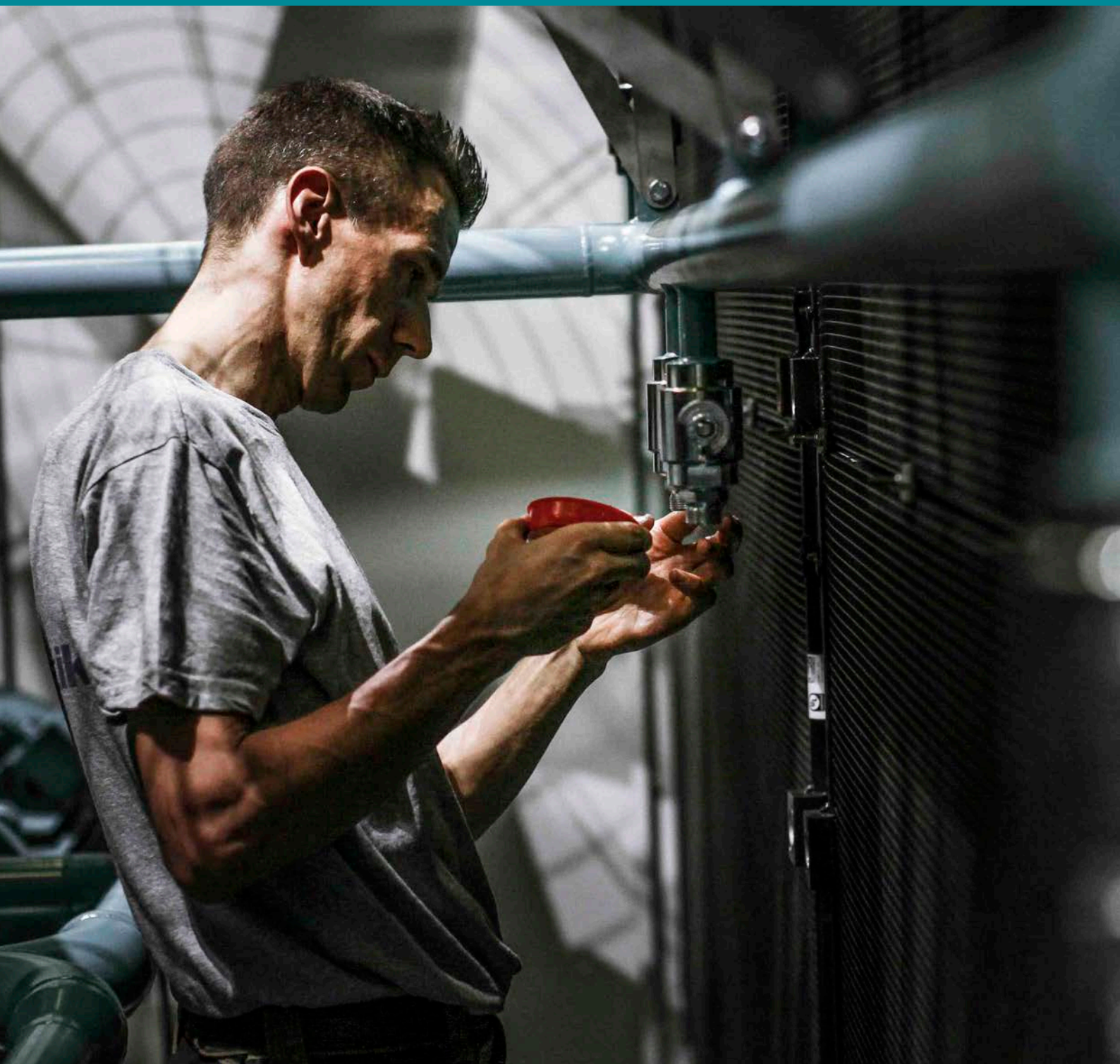
Airmatik® is very flexible. You can mount two types of compressors on it: screw compressors and piston compressors.

It can use three evaporator models: traditional evaporators, flooded evaporators or brine evaporators that produce water around 0.5 °C.

The machines are compact, modular and easy to transport. They are built and thoroughly tested in the factory before delivery.

To satisfy the market, we created machines for various applications: from coolers for air conditioning to low-temperature process cooling.

Airmatik® machines are all custom-made for each customer.



Airmatik[®] industry 4.0

1 Eco-friendly

Natural, environmentally friendly ammonia guarantees the maximum efficiency of these systems. Zudek offers its extensive experience in refrigeration and uses ammonia at the highest levels of safety available today.

2 Sustainable

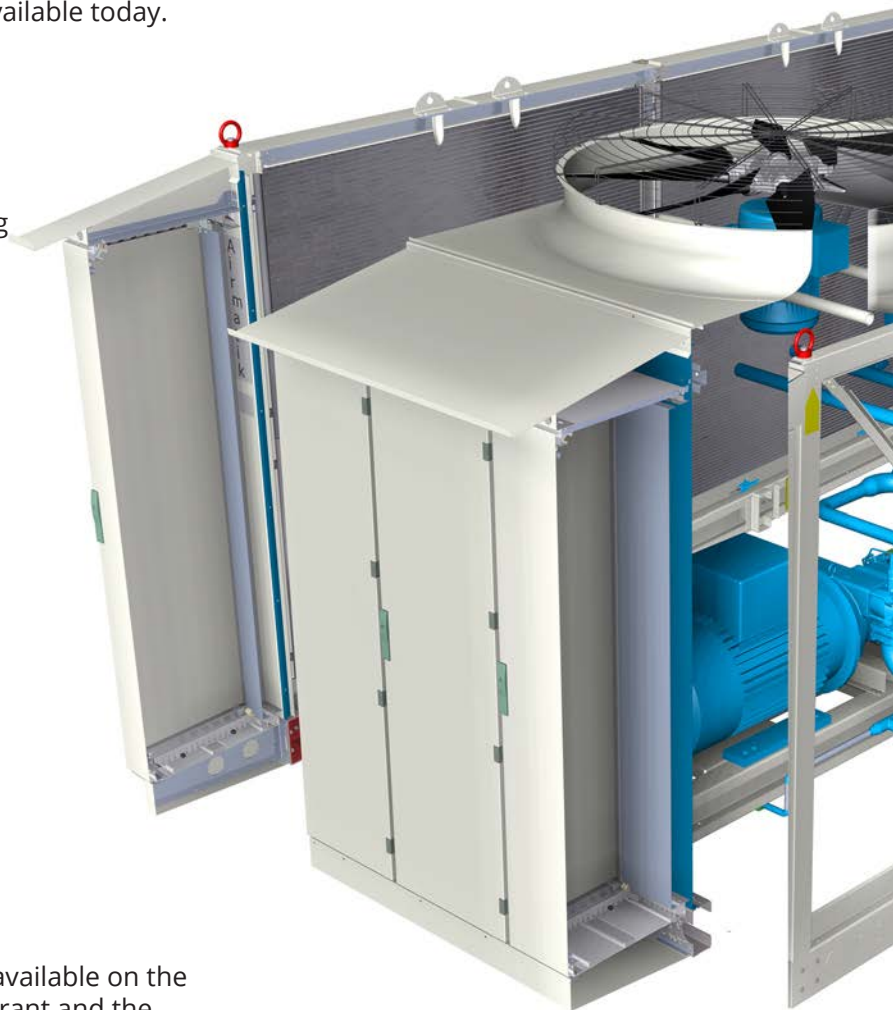
being a green chiller means reducing energy costs and CO₂ emissions.

3 Durable

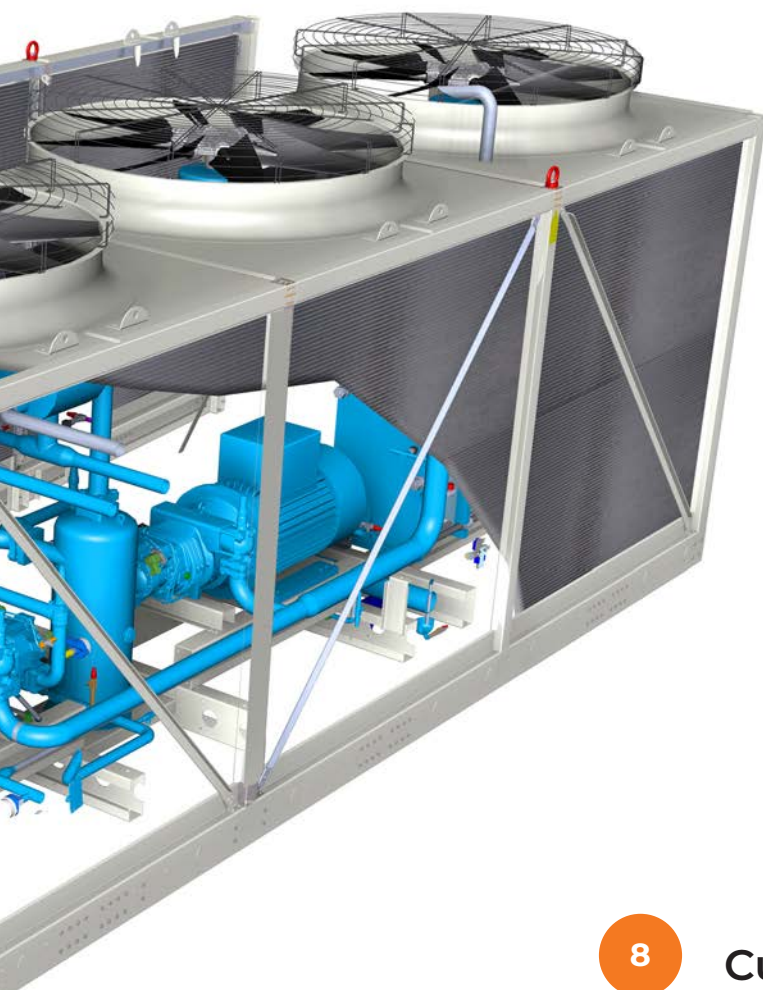
free-standing structure in carbon steel, galvanised and painted or in stainless steel.

4 Efficient

the maximum efficiency available on the market due to the refrigerant and the technologies used for a 30% annual savings over traditional machines.



excellence in air cooling since 2008



5

Compact

ammonia's physical properties can achieve the highest efficiency values (COP), allowing us to reduce the size of the machines and make them more durable.

6

Tested

our **Power test** (factory testing) is a guarantee of certified energy performance for the customer.

7

Monitorable

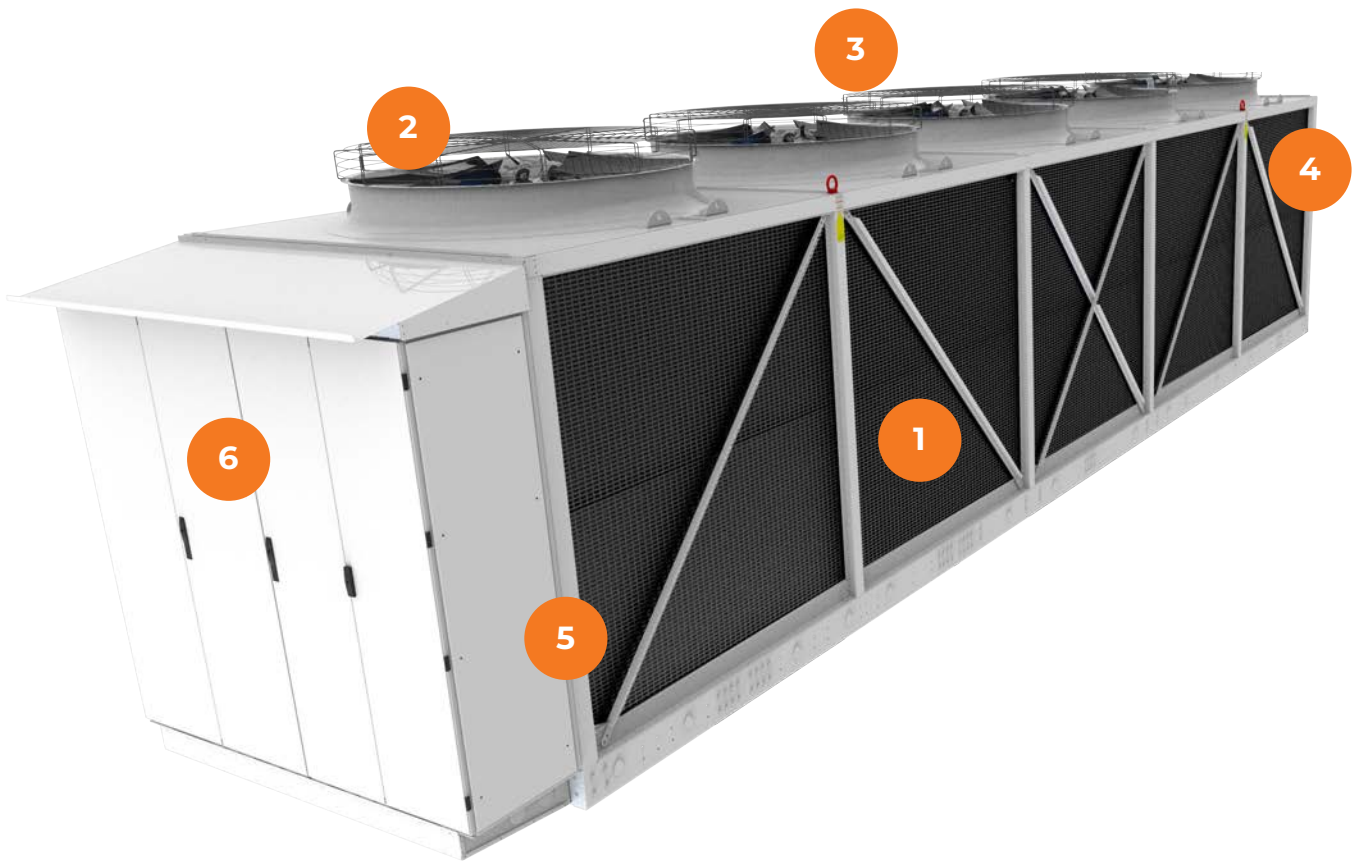
telematik® allows us to perform online analysis and adjust the machine's functioning.

8

Customisable

we can modify any part as needed based on customer requirements, and all chillers can be designed and built in an ATEX version.

advantages



1

Microchannel condensers

the best technology currently available with aluminium microchannels, to ensure the maximum heat exchange and very low ammonia levels. Each condenser can be individually partitioned.

2

1600 mm diameter fans

the large diameter of the fans guarantees low energy consumption for ventilation and 2.1 kWe for every 100 kW of heat with quiet operation.

3

Low noise emissions

axial fans with airfoil blades greatly reduce noise emissions.

4

Very low ammonia levels

since the volume in the aluminium microchannel condensers is very low, the amount of ammonia used in the system has been reduced significantly.

5

Less maintenance

every condensing coil can be replaced easily without compromising the machine's operation, allowing maintenance on individual panels.

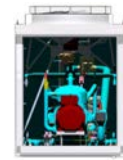
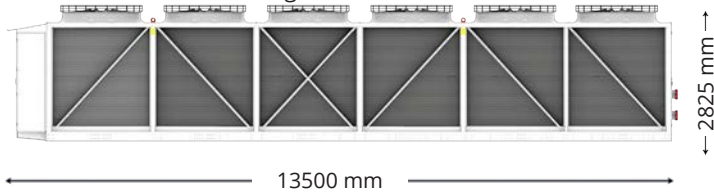
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Simple installation

the chiller was designed for installation on any flat surface and is suitable for lifting and transport in containers.

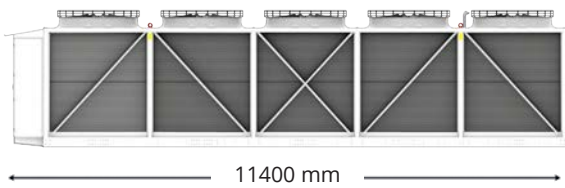
products and power

airmatik 6 12500 kg

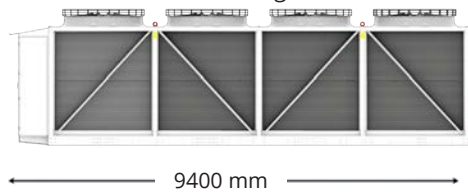


←2200 mm→

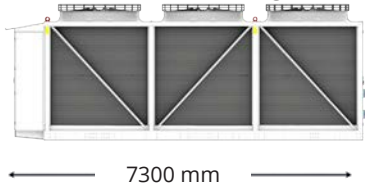
airmatik 5 10000 kg



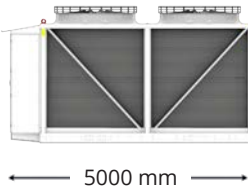
airmatik 4 8500 kg



airmatik 3 7000 kg



airmatik 2 6000 kg



Technical information

screw compressor

ambient air temperature of 35 °C

	water +7°C/+12°C					water/glycol -10°C/-5°C				
	air2	air3	air4	air5	air6	air2	air3	air4	air5	air6
cooling power	300 kW	440 kW	640 kW	800 kW	1000 kW	290 kW	430 kW	590 kW	750 kW	900 kW
EER	3.82	3.76	4.14	4.11	4.08	2.86	2.77	2.85	2.88	2.81
	water/glycol -20°C/-25°C					pumped ammonia -35°C				
	air2	air3	air4	air5	air6	air2	air3	air4	air5	air6
cooling power	250 kW	360 kW	505 kW	650 kW	760 kW	225 kW	345 kW	445 kW	560 kW	680 kW
EER	1.63	1.58	1.70	1.70	1.68	1.20	1.26	1.21	1.18	1.23

compressor with pistons

ambient air temperature of 35 °C

	water +7°C/+12°C					water/glycol -10°C/-5°C				
	air2	air3	air4	air5	air6	air2	air3	air4	air5	air6
cooling power	315 kW	480 kW	630 kW	830 kW	990 kW	295 kW	450 kW	590 kW	700 kW	910 kW
EER	4.07	4.05	4.17	4.15	4.20	2.86	2.77	2.85	2.88	2.81

remote assistance



always by your side

telematik®

All of our chillers and systems are including remote supervision and monitoring. With this service our technicians control all of the machine's parameters in real time, providing remote adjustment and support.

The interface system was developed to meet your needs. All information is recorded and stored by the control system, allowing us to accrue a knowledge base about the environment the machine was installed in, and allowing on-going improvements in functioning and efficiency.

We offer three service levels:

teleSUPPORT

we connect to the machine online and provide telephone consultation on our analysis of its operations

teleINSPECTION

we perform an online analysis and adjust the machine's operation

telePRESENCE

we make any adjustments necessary based on the historic data recorded and optimise the machine's operation, adapting it perfectly to the plant where it was installed.

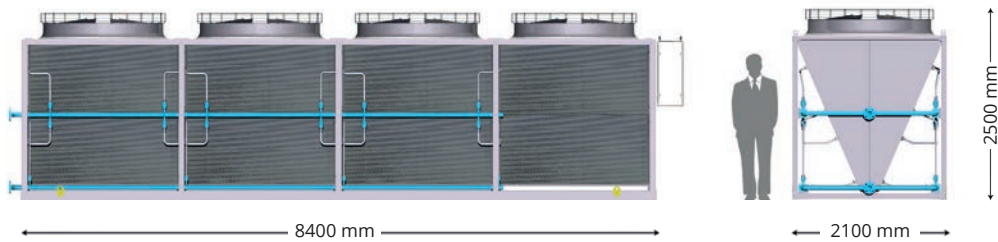
Our **telematik®** service is also available for all of our equipment and systems.

windmatik

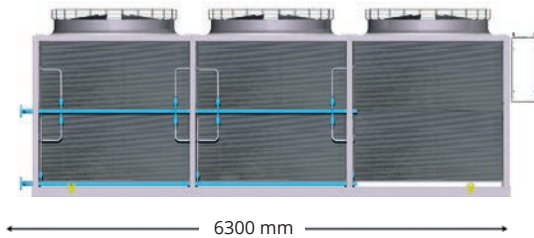
air condenser

Gamma

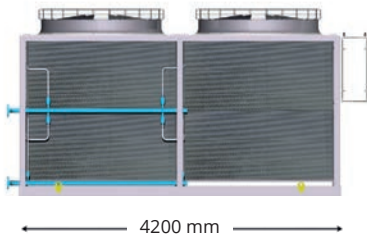
windmatik® 4 2400 kg



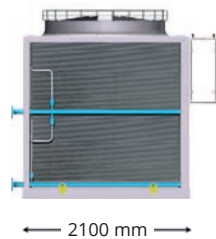
windmatik® 3 1800 kg



windmatik® 2 1200 kg



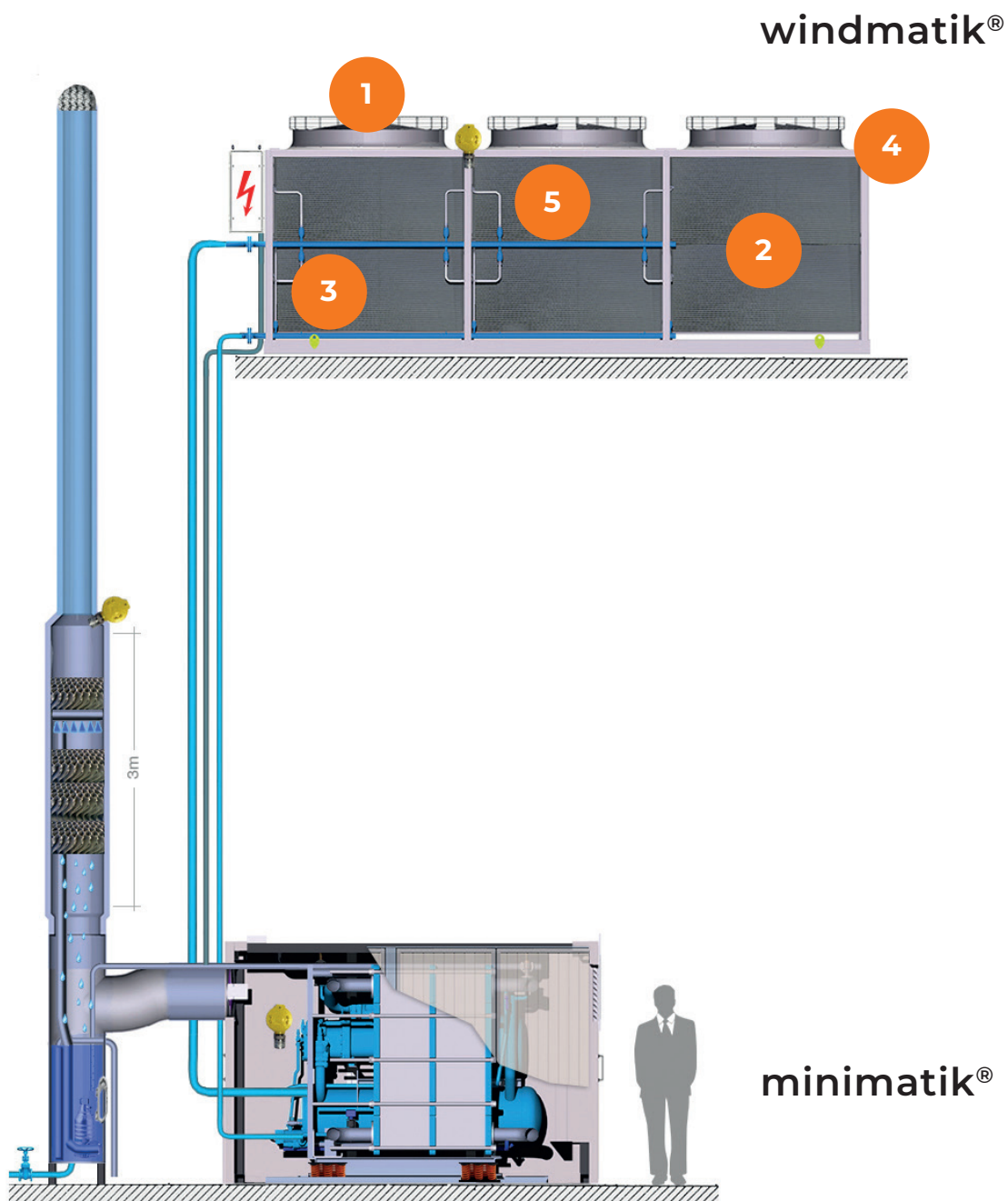
windmatik® 1 600 kg



Technical information

	EXTERIOR TEMPERATURES		NH ₃ CONDENSATION TEMPERATURES			
		36°C	38°C	40°C	42°C	44°C
windmatik® 4	38°C	N.A.	N.A.	N.A.	296kW	514kW
	36°C	N.A.	N.A.	296kW	518kW	710kW
	34°C	N.A.	299kW	522kW	715kW	900kW
	32°C	301kW	526kW	722kW	917kW	1.110kW
	30°C	530kW	726kW	923kW	1.118kW	1.314kW
	28°C	731kW	928kW	1.126kW	1.323kW	1.520kW
windmatik® 3	38°C	N.A.	N.A.	N.A.	222kW	385kW
	36°C	N.A.	N.A.	222kW	389kW	533kW
	34°C	N.A.	224kW	391kW	536kW	682kW
	32°C	226kW	395kW	541kW	688kW	833kW
	30°C	397kW	545kW	692kW	839kW	985kW
	28°C	548kW	696kW	845kW	992kW	1.140kW
windmatik® 2	38°C	N.A.	N.A.	N.A.	148kW	257kW
	36°C	N.A.	N.A.	148kW	259kW	355kW
	34°C	N.A.	150kW	261kW	358kW	454kW
	32°C	150kW	263kW	361kW	458kW	555kW
	30°C	265kW	363kW	462kW	559kW	657kW
	28°C	366kW	464kW	563kW	662kW	760kW
windmatik® 1	38°C	N.A.	N.A.	N.A.	74kW	128kW
	36°C	N.A.	N.A.	74kW	130kW	178kW
	34°C	N.A.	75kW	130kW	179kW	227kW
	32°C	75kW	132kW	180kW	229kW	278kW
	30°C	132kW	183kW	231kW	280kW	328kW
	28°C	183kW	232kW	282kW	331kW	380kW

windmatik®+minimatik®



combined systems

Air condenser born from the **airmatik**[®] experience with microchannels and super-efficient ventilation

- 1 Fans with 65 dB @ 5 m.
- 2 High-efficiency aluminium microchannels.
- 3 Isolating valves for every microchannel.
- 4 2.10 kW electric ventilation for every 100kW of heat.
- 5 Condensers treated to prevent corrosion.

Charleroi Airport Belgium

The Charleroi Airport is Belgium's second busiest airport. In 2008, it opened a new terminal designed to accommodate more than 5,000,000 passengers. For this expansion of the facility, they needed a machine to provide air conditioning for a new traffic control tower.

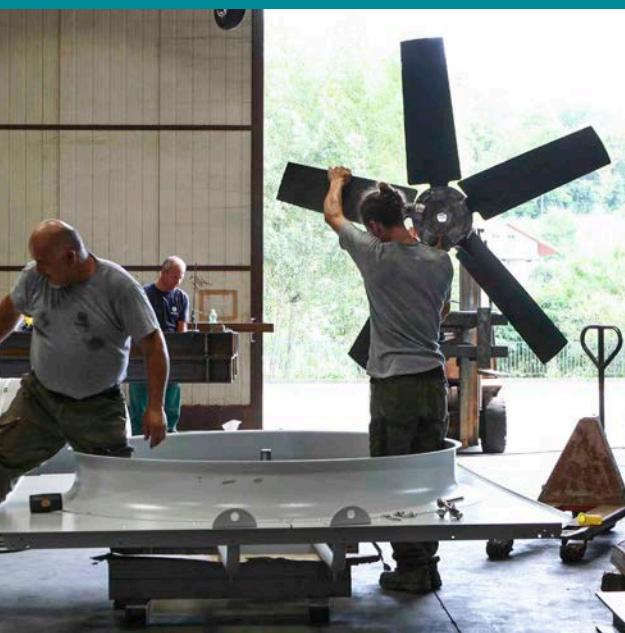
The requirements were:

- high energy efficiency
- easy maintenance
- natural refrigerants
- low noise.

airmatik[®] is the ideal machine for their needs: direct expansion operation, Thermowave evaporators with Bitzer compressors, 700 kW cooling power.

Thanks to the Telematik system, which allows remote control of the chiller's functioning in real time, our customers know they can count on Zudek's 24-hour support.

air conditioning water cooling 7/12°C



Veronesi Group

Italy

The Veronesi Group was founded in 1958 with an idea by Apollinare Veronesi. The Veronesi group is the leading national producer of animal feed, first in European poultry plants under the AIA brand, and one of the top charcuteries in Italy with the Negroni, Fini Salumi and Daniel brands.

The group's focus on innovation and research has always been its strong suit.

They needed to renovate their cooling systems. Their requirement was to produce 10 °C of cooling. They also wanted to save on energy and have a highly innovative system with lots of functions.

They had two designs to evaluate; one was a traditional kind with piston compressors and flooded evaporators, and the other was our **airmatik**®.

Our design included a very low level of ammonia with 1,000 kW of power, an air cooler installed on the facility's roof, with an air condenser that did not use water. We showed them that with our **airmatik**® system they would significantly save energy.

The project was successful, and now Veronesi has a cooling system with our air condensing chillers on their facility's roof.

There were two advantages to this solution:

- no water needed
- no space wasted inside their factory, because the machine was installed on the roof.

processing rooms

glycol cooling
-10°C



Delanchy Group France

The Delanchy Group was established in 1968, and on the strength of its 50 years of experience it established itself as one of the leaders in transport and logistics for fresh products. Initially specialising in fish transport, the group diversified to handle all types of fresh products.

It has its headquarters in France and branches in Italy and Spain.

For their headquarters in Villeneuve Lagarin, they needed machines for their cooling systems that would be easy to install and maintain, that took up minimal space, and that used air rather than water for cooling, because there are many maintenance problems with water, not to mention the risk of Legionella bacteria.

We offered them our **airmatik**[®] chiller with an air condenser, because it has all the features they needed, and it is an integrated structure, compact, modular and easy to transport. It uses a very low level of ammonia and boasts greater energy efficiency than all the other chillers that use synthetic refrigerants.

Also, with our long-distance remote system, **telematik**[®], we can monitor the proper functioning of the machine, allowing constant improvements in operations and efficiency.

We installed four **airmatik**[®] systems on two different platforms.

Now, after years of excellent operation, other important French groups that use cooling platforms are contacting us to renovate their systems.

cold storage
glycol cooling
-5°C



Unilever Italia/Filippine

Algida, an Italian company in the Unilever Group, specialises in the manufacture of packaged ice creams.

Their ice cream manufacturing is mostly done in their facility in Caivano (Naples). It is one of the largest in the world, producing hundreds of millions of ice creams every year for the Italian and European markets.

Algida needed a 1,000 kW air cooling system that used only ammonia. They needed to replace an old cooling system. The new system needed to be installed quickly and brought online fast. Within one month, we had built their equipment in our facility, tested it, moved it to Caivano and installed it.

Unilever, impressed by the reliability of our machine and the advantages of our air technology, trusted us to renovate their facility in Manila in the Philippines.

We designed a custom machine to operate in critical climate conditions.

- Caivano: AIR 5 750 kW glycol -10°C Exterior temperature of 35°C
- Philippines: AIR 5 630 kW glycol -10°C Exterior temperature of 40°C

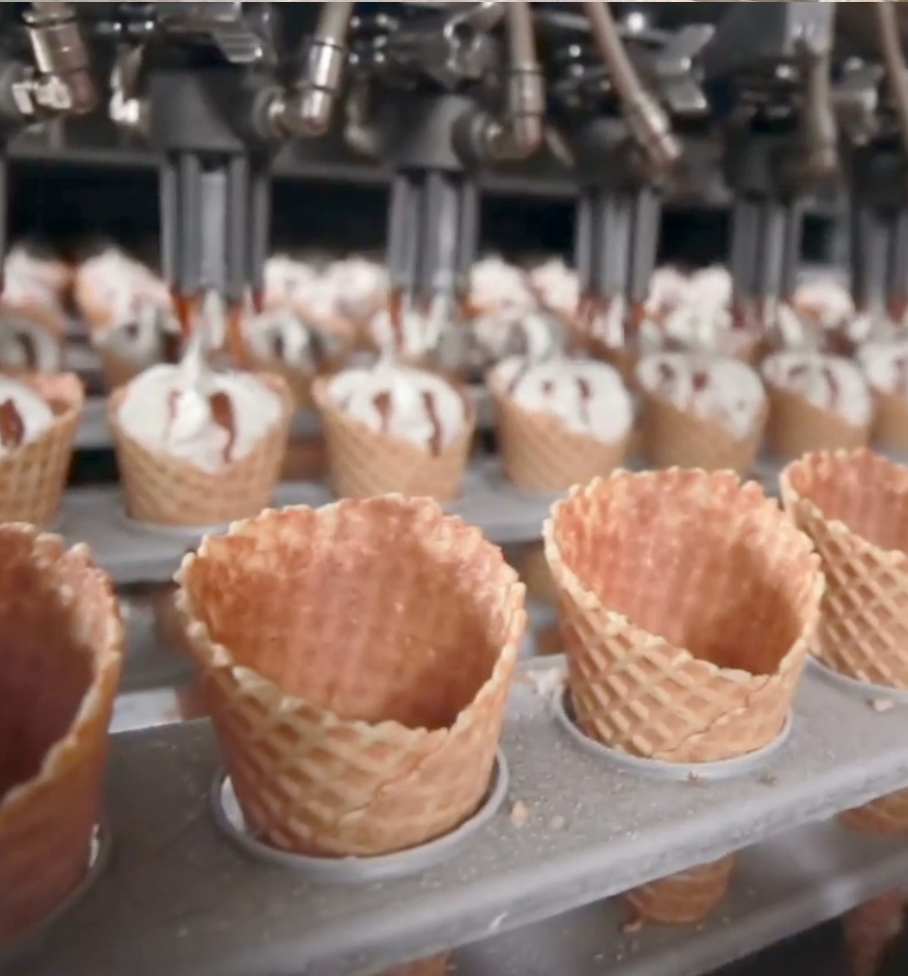
the **airmatik**[®] is easy to transport with a container, anywhere in the world.

The machine underwent the 'powertest' trials in our workshop before shipping to guarantee its efficiency.

The simplicity of the **airmatik**[®] system allowed us to install and finalise the machine in less than one day.

This achievement was also a success!

process
glycol cooling
-10°C



Voltas Technologies

South Africa

Voltas Technologies is an engineering company that develops and provides sustainable energy solutions, focusing in particular on heat energy processes in large-scale industrial and commercial facilities.

At the Chillventa Exhibition in 2009, we were the first in the cooling market to display an air-cooling ammonia machine: the **airmatik**[®].

Voltas visited us at this event.

The company's management was quite impressed with the technology and operation of our equipment.

They were looking for a system to produce air conditioning, a system that would guarantee energy efficiency and use the least power possible.

They were designing skyscrapers in Grayston, a residential area in Johannesburg, and they were looking for systems to put on the roof.

We 'tailor-made' for them an integrated unit that was easy to install, used little refrigerant and saved lots of energy.

Their skyscrapers in Grayston now use four **airmatik**[®] chillers.

HVAC

water 7/12°C



Recordati

Italy

Recordati is an internationally active Italian pharmaceutical group that was founded in 1926. The firm develops and produces pharmaceutical products and chemical pharmaceuticals.

This company relied on us for a chiller to do their process cooling with an output temperature of -40 °C.

The equipment had to be suitable for installation in an area with a Zone 1 classification for explosion risk.

This was a new challenge for us:
to produce a highly efficient machine with ATEX explosion-proof materials.

This shows our dedication to the constant improvement of the quality and reliability of our products. Our business processes, our design, the materials we use, our manufacturing and post-sales service are what helps us to achieve all our objectives.

ATEX zone-pharmaceutical synthetic silicone -40°C

