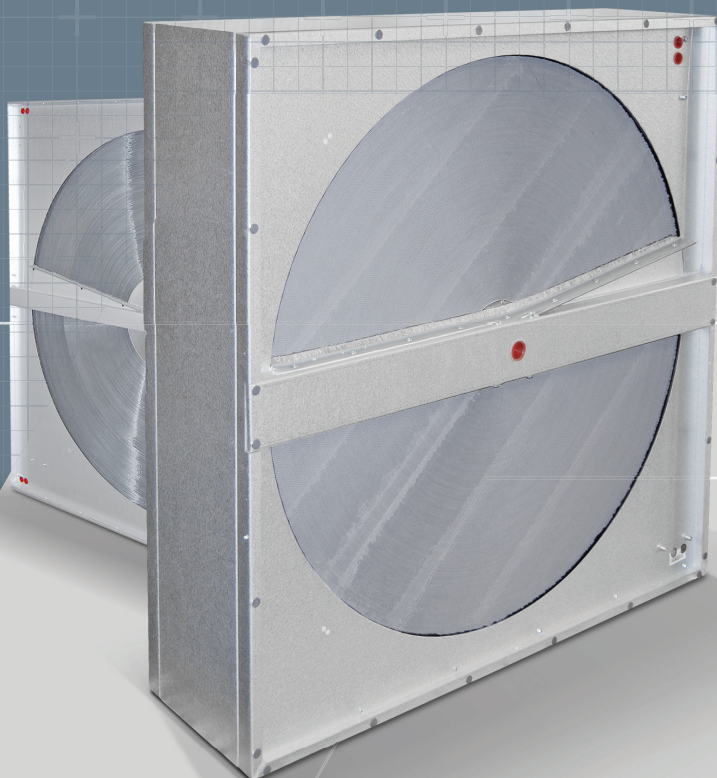


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REGASORP

» PART OF THE ECONOVENT FAMILY



THE **REGASORP** ENERGY RECOVERY WHEEL **REDUCES COSTS UP TO 50%**

Apart from the ventilation rate, the air temperature and the air humidity are two of the most fundamental and important aspects to consider when projecting for a good indoor climate. Studies have proven that a good indoor air climate will not just increase work efficiency, but also reduce the amount of sick-leaves and general complaints.

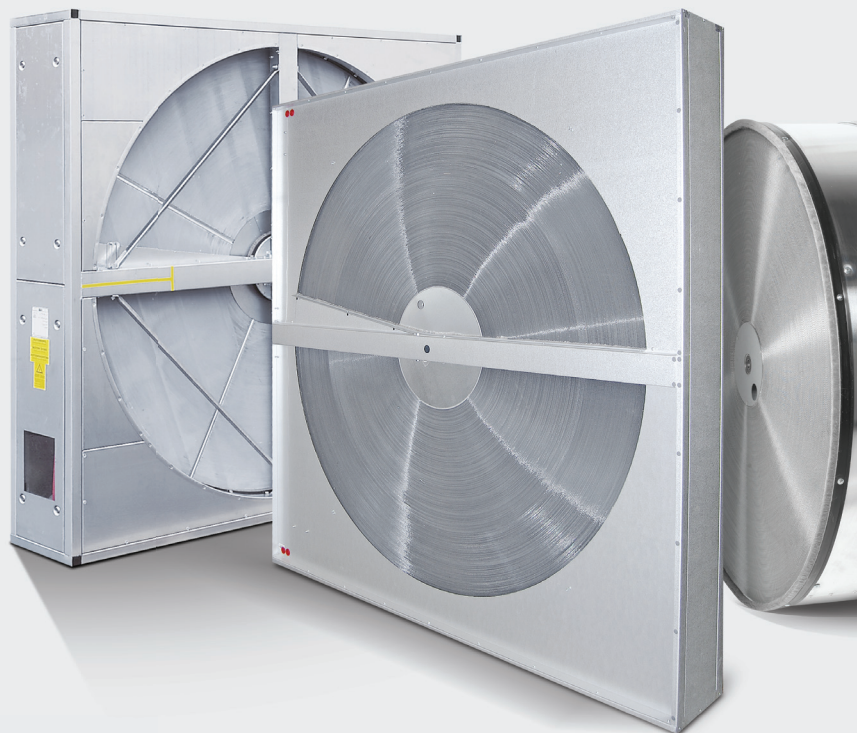
However to achieve a good indoor climate can be quite expensive, at least until now. With the new Econovent wheel "RegAsorp" it is possible to reduce both initial investment- and running costs up to 50%, whilst simultaneously improving the indoor climate.

The RegAsorp is a regenerative sorption wheel. This means that it recovers massive amounts of energy, both sensible (temperature) and latent (moisture). It is further treated with a special molecular-sieve coating (zeolite) which makes it highly selective for moisture targeted to be adsorbed in one air stream and to be desorbed in the other air stream. It can be said that during energy recovery the RegAsorp filters and cleans the air compared to traditional silica gel wheels, and this in the Angstrom measurement scale.

MORE ENERGY RECOVERY DURING THE SUMMER SEASON

When warm outdoor air is cooled and passes the dew point, the moisture condenses to water. This process is energy demanded and requires a correctly sized chiller plant.

The RegAsorp will simplify this process by transferring massive amounts of moisture from the outdoor air directly to the exhaust air. This results in much dryer supply air and considerably reduced energy required to operate the cooling coils. It further enables a much less chiller plant to be used saving initial investment costs.



BETTER INDOOR HUMIDITY LEVEL DURING THE WINTER SEASON

In the winter season many indoor climate claims are referred to the air humidity, especially when the outdoor air is very cold with low absolute humidity. The issue aggravates when the outdoor air is heated to the set supply air temperature since the relative humidity deteriorates even more. A common way to solve this is to humidify the supply air, but this comes with an expense. The RegAsorp will effectively handle this as well by the recovery and transfer of moisture from the extract- to the supply air side. This often leads to a full termination of extra heating needs and the use of extra expensive equipment.

MORE ENERGY RECOVERY DURING THE WINTER SEASON

A typical issue with many energy recovery systems is that they cannot operate during peak cold winter days. This is due to accumulated frost and the only

way to solve this is to preheat the air or in the worst case simply stop the energy recovery completely, until the frost has disappeared. Since the RegAsorp will recover massive amounts of moisture and transfer it back to the building, there is not much moisture left to freeze which enables the RegAsorp to be used to much lower temperature conditions than other wheels or energy recover systems. Own research conducted points to that the RegAsorp can be used with outdoor air temperatures as low as down to -24°C. This is clearly an advantage in cold climates when high energy recovery is greatly appreciated.

So the RegAsorp not just improves the indoor air humidity level, but also enables more energy saving and reduces the initial investment costs in preheating equipment.

EXAMPLE

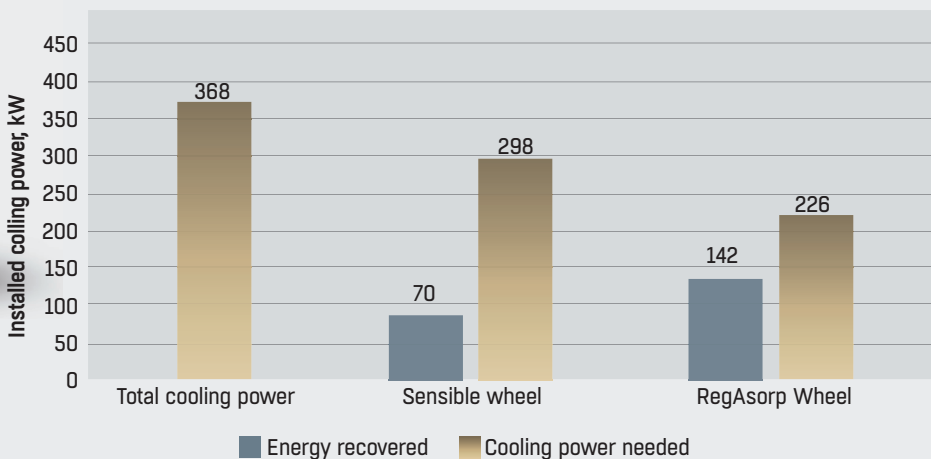
The following example compares a sensible (non-hygroscopic) wheel with a RegAsorp, in terms of installed cooling capacity and cooling energy consumption. Location: Frankfurt, Germany.

To cool 10 m³/s of air from 32°C (50% RH) to a supply air temperature of 15°C, approximately 368 kW is needed. As the bar chart illustrates the RegAsorp will reduce the required installed capacity by 142 kW versus no wheel installation, and 72kW versus a sensible wheel installation. For warmer and more humid locations the savings are even greater with the RegAsorp!

The RegAsorp will also reduce the annual cooling energy consumption by 3756kWh.

The required installed cooling capacity is reduced by 72 kW (298 kW to 226 kW), which corresponds to EUR ~10,000 (incl. less piping, installation work etc.).

The annual cooling energy consumption is reduced by 3756 kWh.



THE **REGASORP** BRINGS BENEFITS IN ALL SEASONS

CASE 1 - SUMMER CONDITIONS

When outdoor air is cooled pass its saturation, the moisture in the air condenses to water. This process requires lots of energy, and further a correctly often oversized expensive chiller plant to manage it.

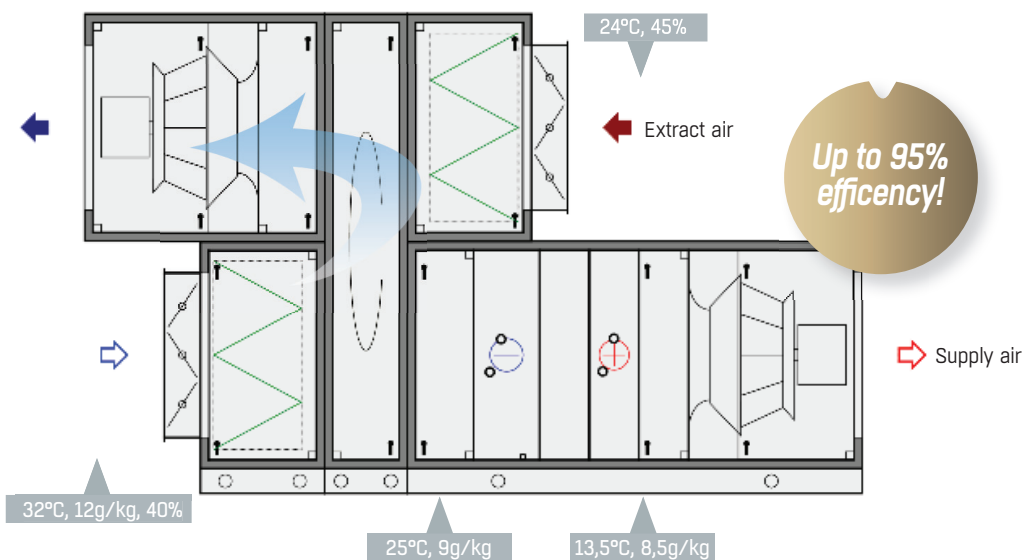
This is especially important in systems requiring special control of the humidity. A chilled beam system is a common example.

HOW?

The RegAsorp efficiently dehumidifies and cools the outdoor air by transferring the heat and moisture to the exhaust air.

BENEFITS

- Substantially reduced cooling energy consumption
- Downsizing of cooling system:
 - Smaller less expensive chillers and coils
 - Smaller cooling circuits: pumps, valves, pipes etc
 - Reduced refrigerant quantities in buildings



The RegAsorp dehumidifies the supply air by transferring 3g/kg directly to the exhaust air. This enables massive savings on chillers and cooling coils.

CASE 2 - WINTER CONDITIONS

During cold winter days heat recovery systems often face frost problems. If not prevented, the process leads to increased pressure drops with reduced energy recovery. To avoid this scenario most recovery systems are equipped with frost protection systems which typically cost a lot of energy and money. The RegAsorp will efficiently solve most of the frost problems as well!

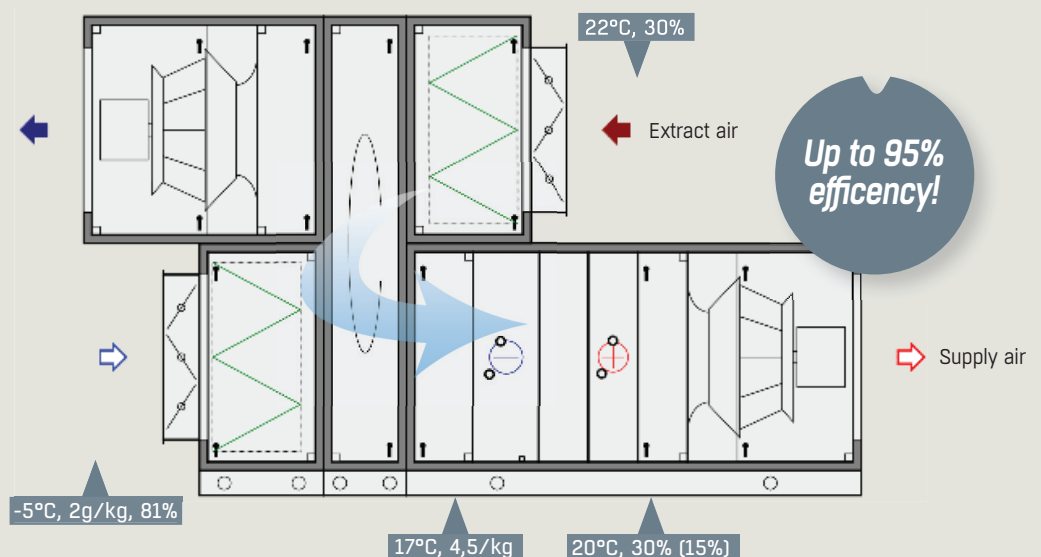
HOW?

The RegAsorp selectively recovers the moisture in the extract air and transfers it back to the building via the supply air.

BENEFITS

- Reduced heating energy costs by avoiding defrosting
- Reduced heating system size saving initial costs
- Higher moisture content in the supply air providing better indoor climate
- Enhanced reliability in the winter due to less frosting problems

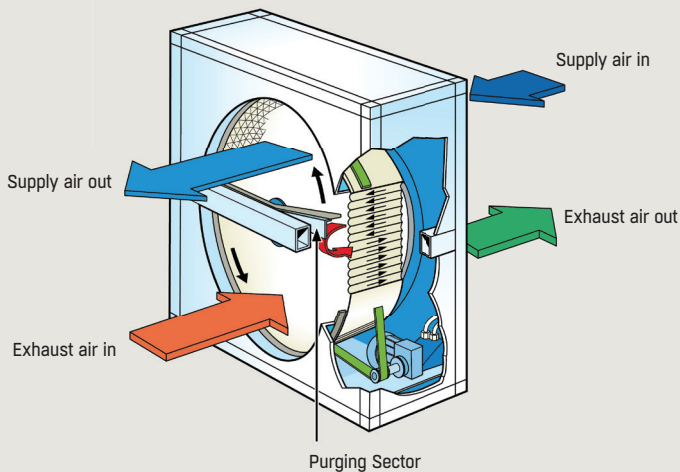
The supply air relative humidity increases from 15% to 30% with a RegAsorp which results in much improved indoor air climate.



CLEAN SUPPLY AIR

There is no other component in the air handling unit that can save as much energy as the energy recovery wheel. However with all good things there are limitations to consider when projecting. For wheels its especially the cross contamination from the extract- to the supply air flow, that needs special attention.

First, there should always be a slight over-pressure on the supply air outlet- versus the exhaust air inlet side. This is typically achieved by selecting the fans in suction mode. Further, a purge sector should always be used and its angle must be correctly commissioned in regards to the rotor depth, rotational speed and pressure differentials. A high quality center- and periphery brush sealing must also be used. With this set up there is only one more thing to consider - the wheel matrix.

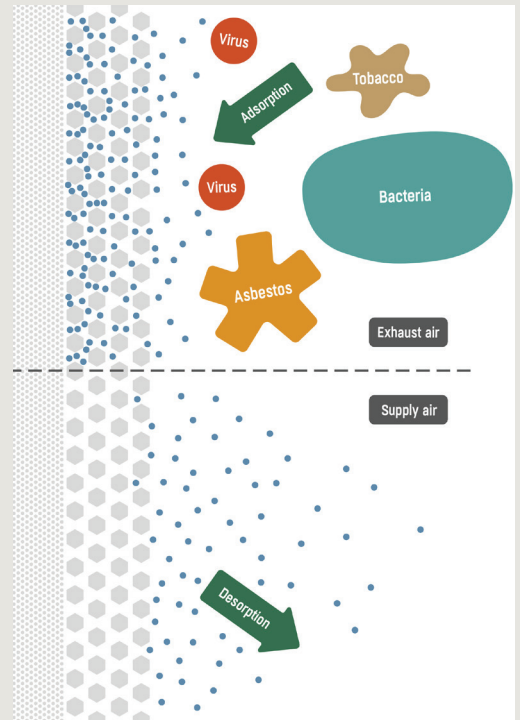


VALUE CREATION THROUGH DIFFERENTIATION!

The RegAsorp's coated matrix derives from an own developed zeolite coating recipe, optimized for energy recovery purposes. The complex coating process is performed internally to master and secure all parts of the process. Vast tests have confirmed limited cross contamination, best-in-class performance and longevity at normal and more extreme conditions.

The secret behind the exceptionally good performance, generally 5-15% better compared to other manufacturers!, is partly due to the coating process but also since much thinner aluminum foil is used, around 40% thinner! This has further a positive impact on the weight, which typically is 30-50% less compared to other manufacturers!

Finally, the special rotor winding process with the use of an adhesive instead of spikes or rods also provides benefits such as; rigidity, longevity and less accumulation of contaminations in the wheel matrix. So, easier to install and less maintenance needed!



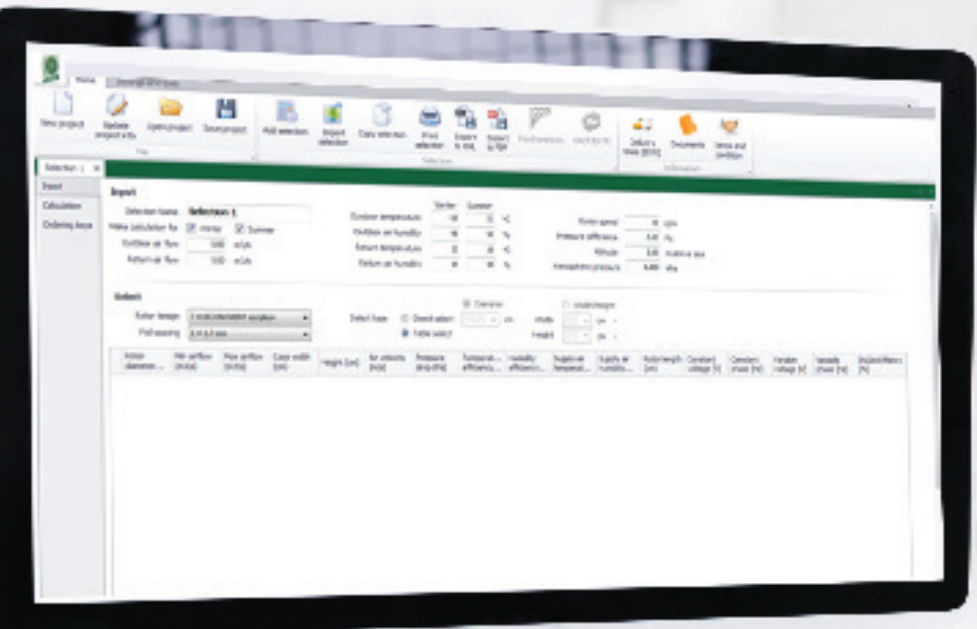
Example of moisture recovery. The picture illustrates how the RegAsorp through adsorption selectively recovers moisture from the exhaust air, and transfers it back to the building via the supply air through desorption.

DESICCANTS

Silica gels are used for their renowned capacity to adsorb moisture, providing high humidity recovery. This however to the expense of sometimes also recover unwanted particles from the exhaust air.

Zeolites which are getting more popular are especially used for their selectivity during adsorption. The downside however is often less performance, forcing the use of more rotor desiccant loads!

The RegAsorp uses a special zeolite and enables the advantages of both, mainly since more load can be used at remained low pressure drops.



ECONOVENT INSIDE

The Econovent Inside tool has been developed to enable swift and accurate selections, presented in a straight forward well understood way. A special focus has been put on the user-friendliness with fast selection response times.

It is a so called stand-alone tool, i.e. no internet access is required.

The tool offers several valuable functions such as;

- quick selection
- project selection
- document archive
- price list generation
- delivery times
- quotation

The Econovent Inside tool can be downloaded from www.flaktgroup.com

INSIDE

Project: **Levick** Date: **2017.03.20**
 Customer: **RWE O&M** Price: **250** EUR
 Unit number: **RWE Ragnorup** Delivery date: **12** 2017
 Unit name: **RWE Ragnorup** Type & cond.: **Chiller 22012**
 Model code: **PVAV-100-0-3-3-3-3-3-3-0**

Motor type: **Ragnorup**
 Full load: **1.770**
 Motor: **Wound not selected (see 420-230)**
 Motor (incl. motor motor): **0/selected**

Exhaust power: **1500** kW
 intake: **200** kW

Technical performance	Heating		Cooling		Unit
	Supply air	Exhaust air	Supply air	Exhaust air	
Temperature efficiency	X	X	X	X	%
Humidity efficiency	X	X	X	X	%
Capacity efficiency	X	X	X	X	%
Pressure drop (at cond. 1.2kg/h ²)	X	X	X	X	Pa
Flow air velocity (at cond. 1.2kg/h ²)	X	X	X	X	m/s
Pressure drop (actual)	X	X	X	X	Pa
Flow air velocity (actual)	X	X	X	X	m/s
*T _{sp} Temperature efficiency (at cond.)	X	X	X	X	%
*Temperature effectiveness	X	X	X	X	%
*Humidity effectiveness	X	X	X	X	%
*Available effectiveness	X	X	X	X	%
Capacity reduction variable	X	X	X	X	kg
Capacity reduction limit	X	X	X	X	kg
Capacity reduction limit	X	X	X	X	kg
Humidification / Dehumidification (at)	X	X	X	X	g/kg
Flow water (condensate)	X	X	X	X	l/h
Net of freezing	X	X	X	X	Yes/No
Net	X	X	X	X	Yes/No
Standard air volume flow rate (L, 2kg/h ²)	X	X	X	X	m ³ /s
Air mass flow rate (actual)	X	X	X	X	kg/h
Temperature	X	X	X	X	°C
Relative humidity	X	X	X	X	%
Absolute humidity	X	X	X	X	g/kg
OS	X	X	X	X	Yes/No
Standard air volume flow rate (L, 2kg/h ²)	X	X	X	X	m ³ /s
Air mass flow rate (actual)	X	X	X	X	kg/h
Temperature	X	X	X	X	°C
Relative humidity	X	X	X	X	%
Absolute humidity	X	X	X	X	g/kg
Refrigerant used	X	X	X	X	kg
Pressure / Atmospheric pressure	X	X	X	X	mbar

*APRVAZ/1. 2.5. APRVAZ/2015 046. Method of testing 430-co-ax heat exchanger. 2002
 **T_{sp} conditions with balanced mass air flows

A HISTORY OF INNOVATION AND RELIABILITY

With more than a century of accumulated industry experience, FläktGroup is in a unique position to deliver energy efficient components and solutions for integrated performance, reliability and quality. With modern manufacturing technologies, precise deliveries and technical support, FläktGroup is your partner – fulfilling and surpassing industry standards and certifications.

» Learn more on www.flaktgroup.com
or contact one of our offices