



## **MUCH – Make Up Air Handling Units with Cooling and Heating Recovery.**

A combination of common chilled water cooling technology and a high efficiency heat recovery system allows extensive savings of cost and energy.

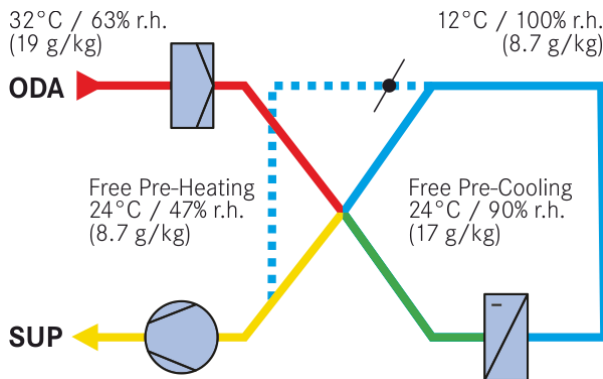
# MUCH – Make Up Air Handling Units with Cooling and Heating Recovery

Indoor air quality is a goal of air ventilation. One of most important element is quality of fresh air. Tropical climate is always hot and humid. Getting comfort condition of fresh air, needs to cooling and dehumidifying the air.

Typical method to cooling and dehumidifying the air, that's by cooling coil. Air moisture content will be removed from air steam by cooling coil. To get low moisture content, then lowering air temperature after cooling coil is needed. And it always has to over cool air off coil temperature to achieve desire moisture content. It makes us need to heating up air temperature to comfort temperature. For cooling and reheating air, it needs energy.

## MUCH – A new way to save costs and energy for Make Up Air Handling Units

Thanks to our innovation Make Up with Cooling and Heating Recovery (MUCH), we create a new way to save energy for operating Make Up Air Handling Units (MAU) – the combination of common chilled water cooling technology with a high efficiency heat recovery system. From our innovation, our customer would get free cooling capacity which will be used to pre-cooled fresh air at first state. Our customer would save cooling capacity on main cooling coil. Pre-cooled air will be dehumidified and cooled again by main cooling coil. After main cooling coil, air steam will be heat up from the over cool air temperature. Heating capacity is free heating energy that we take from pre cooled air process.



### MUCH-Scheme

- New developed cooling and heating recovery system
- Free pre-cooling capacity, chilled water energy saving (more than 25% savings).
- Free re-heating, zero energy required e.g. with Electric heater (100% savings).
- Easy controllable
- Low investment cost

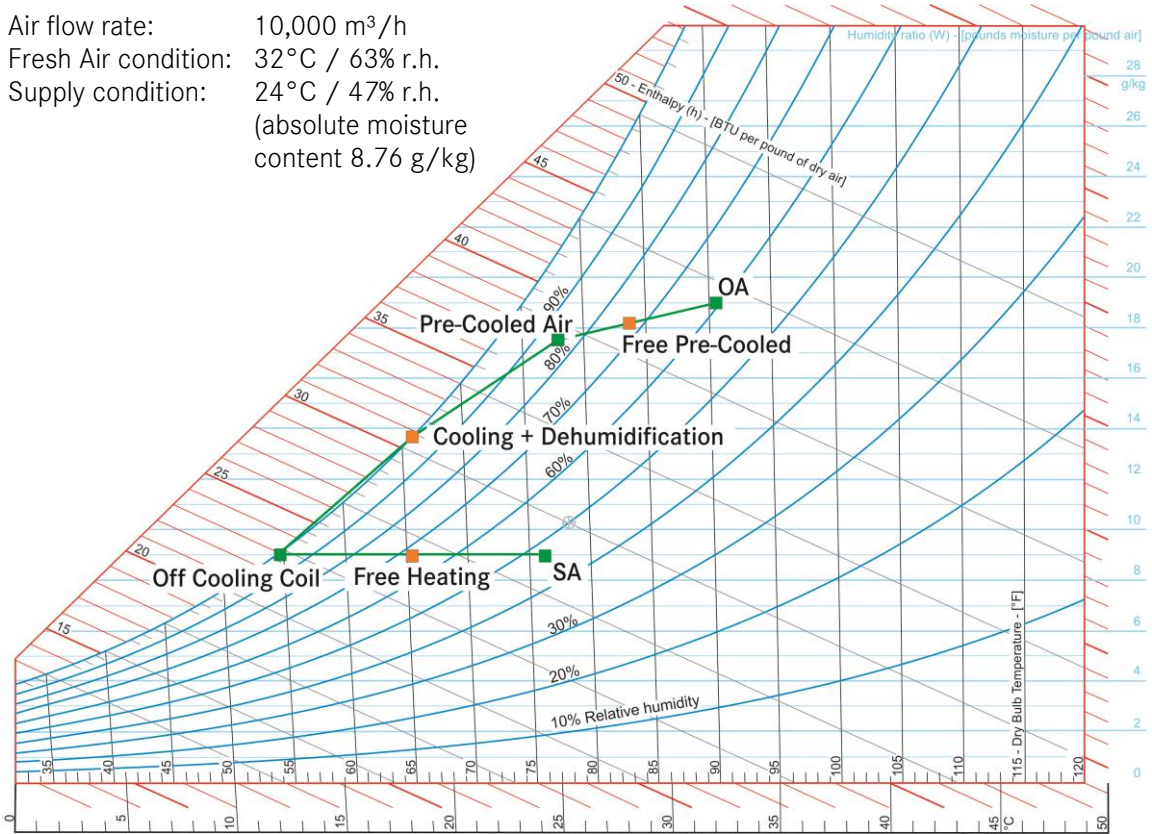
### Heat Recovery System

- For pre-cooling and re-heating of air
- High thermal efficiency
- High operational safety
- Easy to maintenance with no moving parts, no wear and tear parts
- Air to air system with no heat transfer media
- Seawater-resistant aluminium
- Bypass for controllable capacity (optional)
- No additional installation work required e.g. pump or piping

# MUCH – Extensive savings for heating and cooling energy

## Example

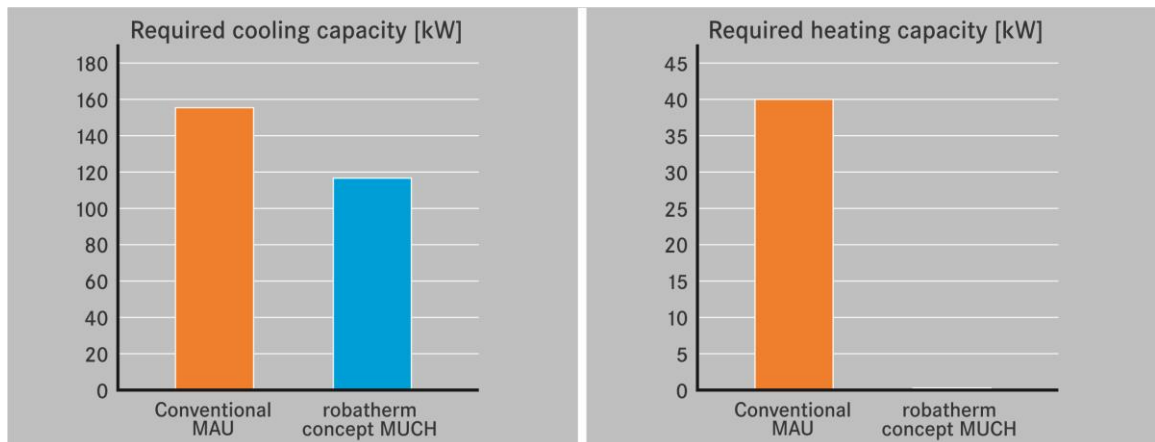
Air flow rate: 10,000 m<sup>3</sup>/h  
 Fresh Air condition: 32°C / 63% r.h.  
 Supply condition: 24°C / 47% r.h.  
 (absolute moisture content 8.76 g/kg)



## Results

Conventional MAU require: 156.2 kW of cooling capacity  
 40.2 kW of heating capacity

robatherm new concept MUCH require: 115.2 kW of cooling capacity 26% savings  
 0 kW of heating capacity 100% savings



## MUCH – Premium quality for housing, components and performance

### Unit Housing



- Premium housing construction
- Low tendency of housing condensation due to best class TB1 (EN 1886)
- Low heat dissipation: T2 (EN 1886)
- High airtightness: L1(M) (EN 1886)
- Sturdy base framework for easy site handling
- Lifting eyes on the unit ´s roof for easy transportation

### EC-Fans (optional)



- Efficiency optimized, direct-driven fans
- State-of-the-art motor technology with permanent magnet-charged synchronous exterior rotor motors (EC-motor) in the highest energy efficiency class “Super Premium Efficiency” (IE4 in accordance with IEC 60034-30)
- Low energy consumption

### Certified Performance



- With EUROVENT-Energy Efficiency Label (2016)
- Certified performance for fan and heat recovery system

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