

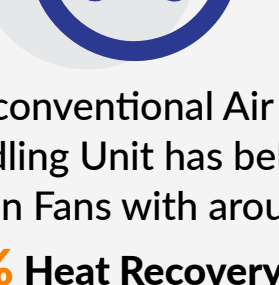
# THE DAMVENT MAX E-3 HYBRID AIR HANDLING UNITS PROVIDES SUBSTANTIAL SAVINGS VERSUS CONVENTIONAL AIR HANDLING SYSTEMS



## THE BUILDING DETAILS FOR COMPARISON: An Office Building in Central London.

We are comparing the **purchase and running Costs of a Std Air Handling Unit** an air flow of 5.3 M3/s with Heat Recovery using a rotary heat exchanger vs a Damvent Hybrid Air Handling unit with 2-stage Heat Recovery

For comparison, the heating is provided by gas boilers, and cooling by an Air Cooled Chiller. The space temperature in winter is **22C with an external temperature of 5C. In Summer Mode the space temperature of 18C with an external temperature of 30C.**



The conventional Air Handling Unit with belt driven Fans with around **40% Heat Recovery** and operates for **3,500 hours p/a.**

The Damvent Max E-3 Hybrid Air Handling Unit. Also operates with for **3,500 hours p/a.** Both units use electricity at 0.15p/kwh



## THE DAMVENT PERFORMANCE DATA IS BELOW



### PERFORMANCE

Take a look at the improved technology

- Increased Total Filtration Area (m2)** by 45%
- Sound Pressure Level**, reduced up to 5 dB(A)
- Decreased Total Internal Pressure Drop (Pa)** by 20+40%
- Stepless Capacity Control**
- Precise Condensing Temperature/Pressure control** during the summer mode
- Up to 78% humidity recovery** during the winter mode
- Higher Total Heating Capacity (kW)** by 30+ 35%
- 30+45% higher Total Cooling Capacity (kW)**

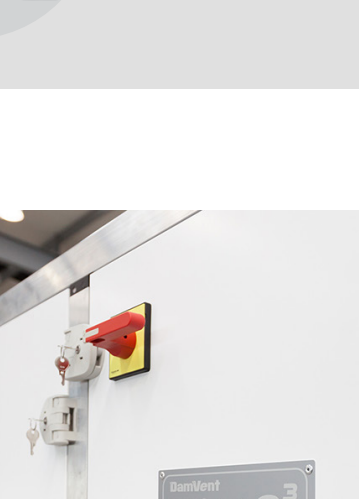
## ADVANTAGES

### FOR THE INVESTOR



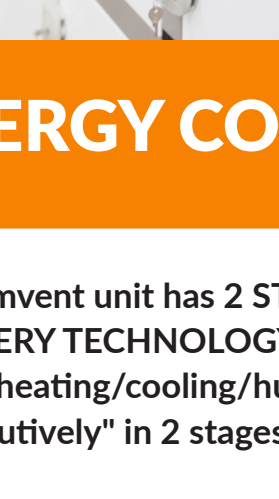
- Significant reduction in initial investment costs
- Significant reduction of installed power
- Low operating (energy) costs
- Saved Space
- Easy maintenance – mono-block unit
- Internet monitoring
- 100% Factory Tested
- Low noise performance

### FOR DESIGNERS AND CONSULTANTS



- Significant reduction in initial investment costs
- Significant reduction of installed power
- Low operating (energy) costs
- Saved Space
- Easy maintenance – mono-block unit
- Internet monitoring
- 100% Factory Tested
- Low noise performance

### FOR INSTALLATION COMPANIES



- Easy installation on site (needs only connection to the ducts system and power supply)
- Connection to the BMS system through different protocols
- Setting up the unit through Internet
- Lack of working with refrigerants on site

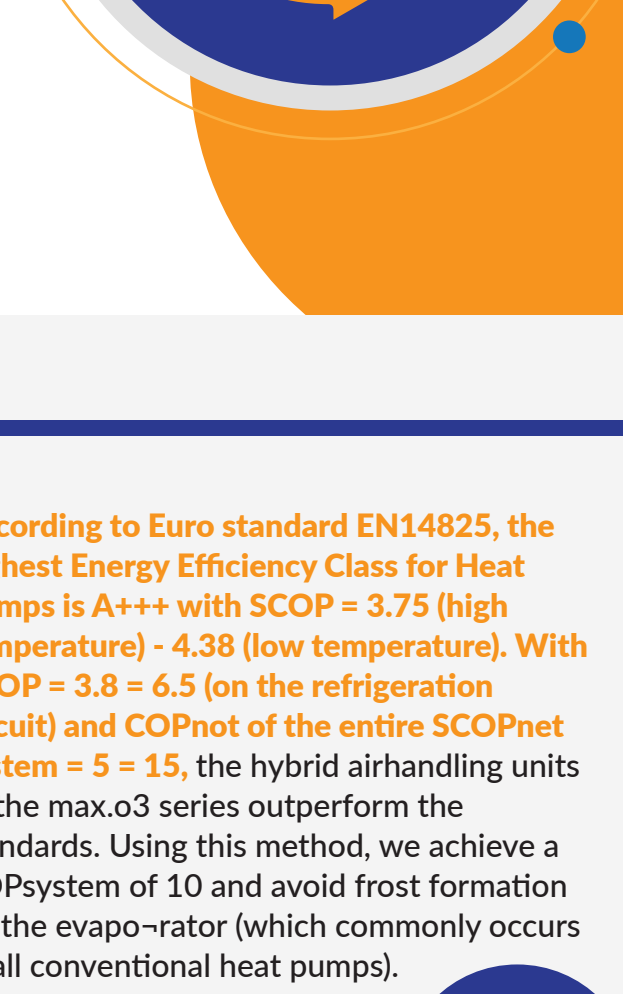


## ENERGY CONSUMPTION

The Damvent unit has 2 STAGE HEAT/COOL/HUMIDITY RECOVERY TECHNOLOGY Recovering up to 100% of the extract heating/cooling/humidity, achieved - "consecutively" in 2 stages:

1st stage - the rotary heat exchanger, recovers more than 60-80% of the heating/cooling and humidity.  
2nd stage - the evaporator/condenser of the air to air heat pump, thus recovering the other 20+35%. In this way, we extract up to and more than 100% of the heat from the room air.

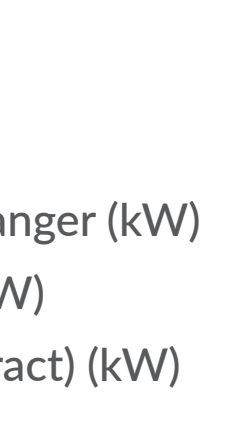
Energy Savings 132,000 kwh/per annum which at 0.15p/kwh giving a payback of the Damvent Max-E3 in less than 4-years vs a conventional Air Handling unit with 40% single stage heat recovery.



## COP/SCOP/SPF

A conventional air cooled heat pump uses the ambient air for the evaporation process and during the winter this air can reach temperatures of -10°C, -15°C or even -20°C. Extracting heat from the ambient air is an inefficient process. In comparison, max.e<sup>3</sup> uses the extract air from the room. Under normal conditions, this air ranges in temperatures from 20±24°C. Firstly, 65÷80% of the heat and humidity is recovered in the rotary/plate heat exchanger and then at a temperature between 1÷6°C, the air enters the evaporator of the heat pump, thus recovering the other 20+35%. In this way, we extract up to and more than 100% of the heat from the room air.

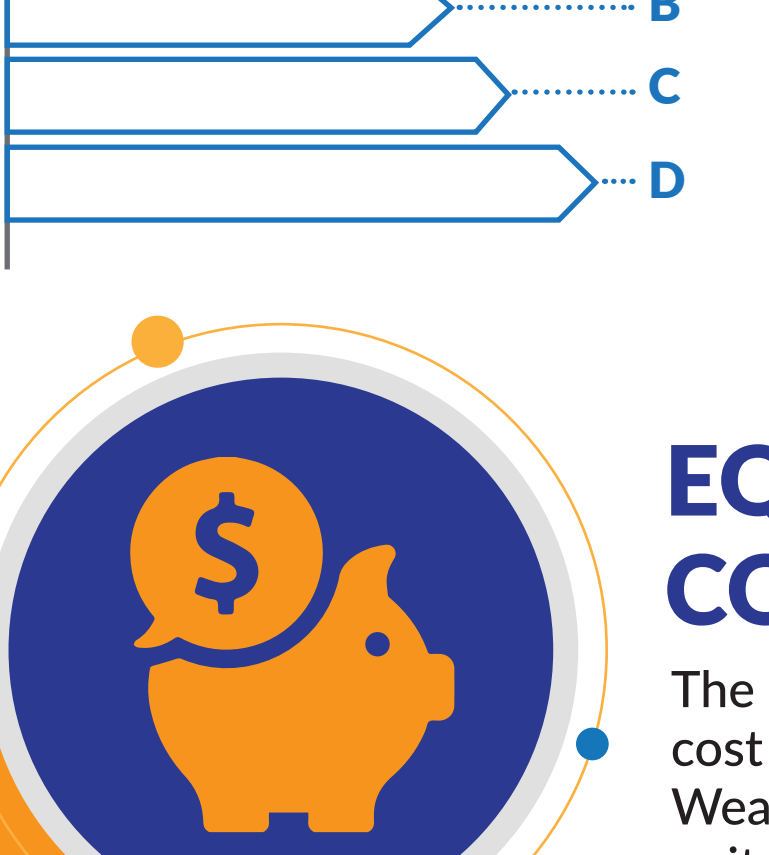
According to Euro standard EN14825, the highest Energy Efficiency Class for Heat Pumps is A+++ with SCOP = 3.75 (high temperature) - 4.38 (low temperature). With SCOP = 3.8 - 6.5 (on the refrigeration circuit) and COPnot of the entire SCOPnet system = 5 - 15, the hybrid airhandling units of the max.e3 series outperform the standards. Using this method, we achieve a COPsystem of 10 and avoid frost formation on the evapo-rator (which commonly occurs in all conventional heat pumps).



$$\text{COPnet} = \frac{\text{Q heat recovery} + \text{Q heat pump}}{\text{N fans} + \text{N compressor}}$$

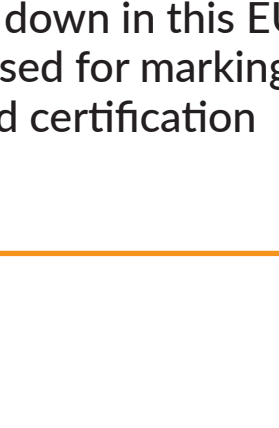
### Where:

- Q heat recovery - recovered heat in rotary / plate heat exchanger (kW)
- Q heat pump - heat capacity of the heat pump condenser (kW)
- N fans - power consumption from both fans (supply and extract) (kW)
- N compressors - compressor power consumption (kW)



### Note:

SCOPnot - seasonal efficiency of the unit in heating mode, with no additional electric heaters, determined by the mandatory conditions laid down in this EU standard and used for marking, comparison and certification purposes



## EQUIPMENT COST SAVINGS

The Damvent Max E-3 Hybrid unit cost savings vs an equivalent Weatherite conventional Air Handling unit is around 10-15% less.

## CAPITAL COST COMPARISON

Hybrid AHU with implemented heat pump automation and control system

- AHU with DX/water section
- Outside mounted air-cooled heat pump
- Boiler for the water systems – for working on very low outside temperatures
- Pipes, fastenings, isolation, etc.
- Pumps (for water systems)
- Extra Labor
- Common automation and controlling system
- Higher installed power electricity capacity – higher costs for wiring
- Higher BMS costs – two or more systems
- More space for installation

Traditional Systems

## BMS/CONTROL SYSTEM SAVINGS

The Max E-3 hybrid AHU also removes the need for a BMS or separate control system, due to the integrated Energy Management/Monitoring system.

As standard the unit is equipped with an Energy Meter for measuring and recording the Total Energy Consumption (kWh) and a includes gateway for remote monitoring the units operating conditions from anywhere.

