Certification of AHU: A Key for Sustainable Buildings and Enhanced Indoor Air Quality.

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

AMCA European Fan Symposium 2024

Dr. Sylvain COURTEY

President, EUROVENT CERTIFICATION

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

AMCA European Fan Symposium 2024

Presentation Outline

01

Facts And Numbers

02

Effect of AHU on Building Efficiency

03

Performances Certification

04

Conclusion

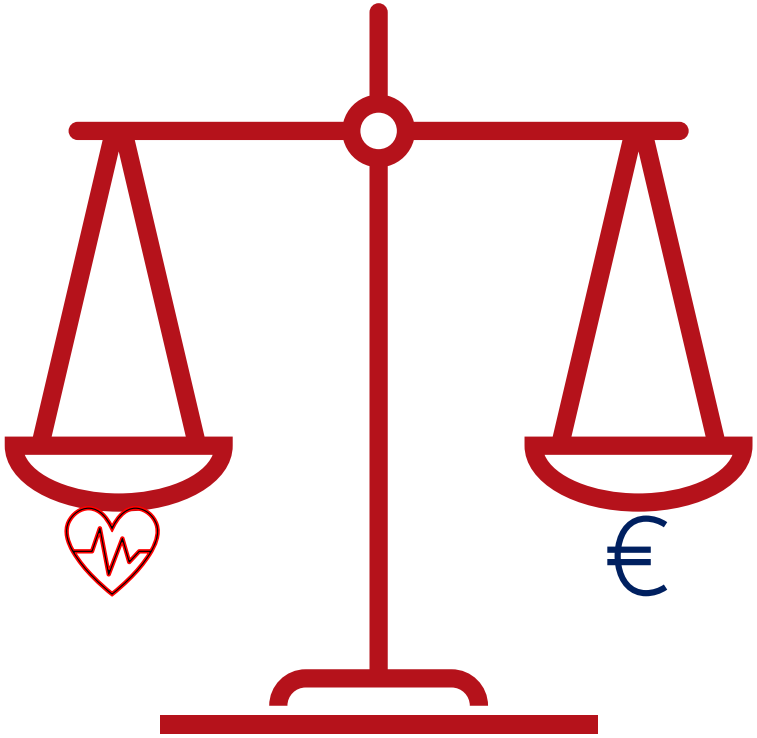
Presentation Point 01

Facts And Numbers

Facts and numbers

7 millions Death

In 2023 globally due the IAQ (WHO)



114 %

Average increase in household electricity prices in EU between 2021 and 2022

Facts and numbers

52 µg/m³

Concentration of PM 2.5 in Bad Windsheim in June (WHO recommand a maximum of 5 µg/m³)

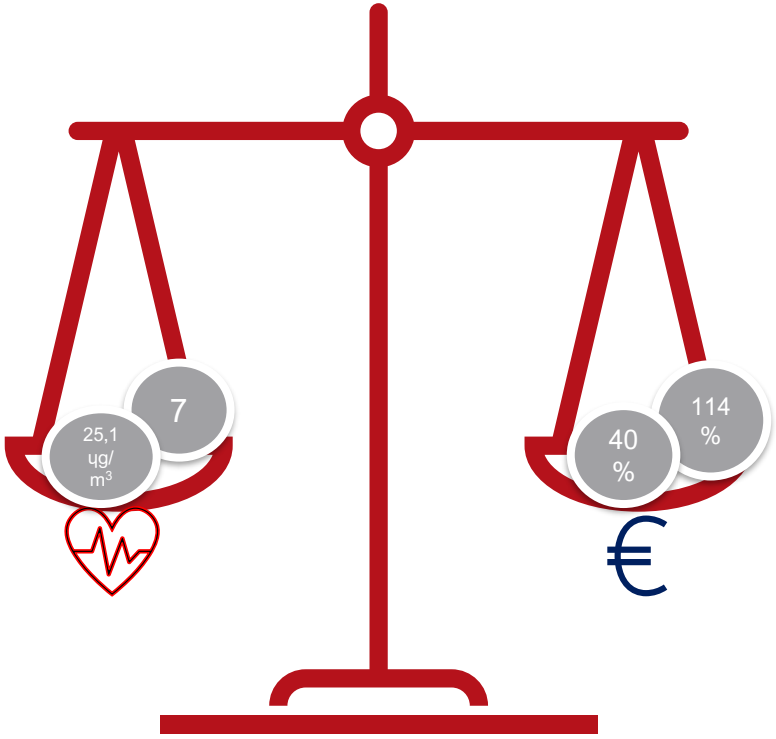
40 %

HVAC part in building energy consumption

Facts and numbers

20,000 Patient

Surgical site infection (SSI) cases in EU in 2020



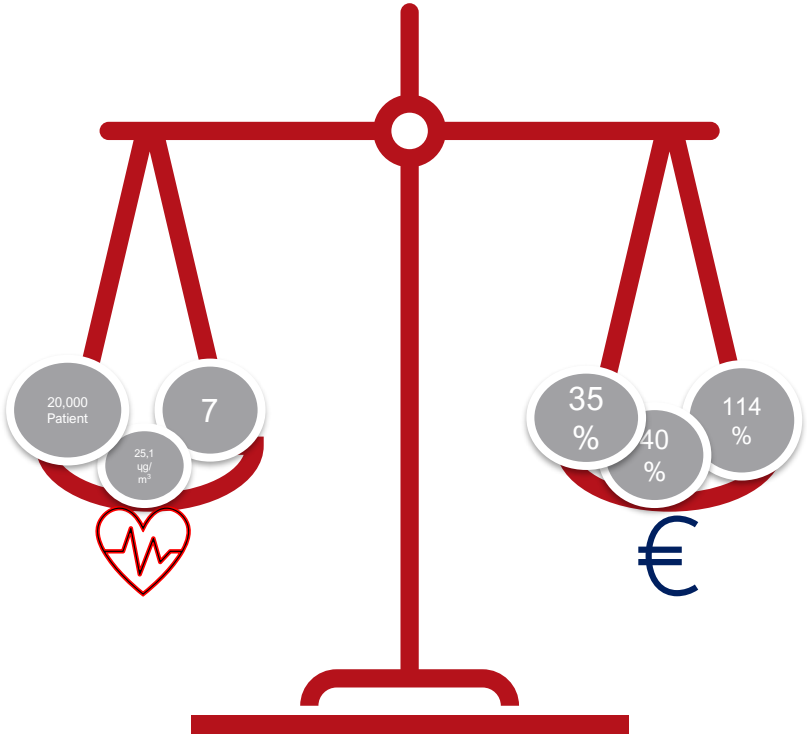
35 %

The part of mechanical ventilation in HVAC consumption

Facts and numbers

5 %

Filtration efficiency difference between 2 grades of filters



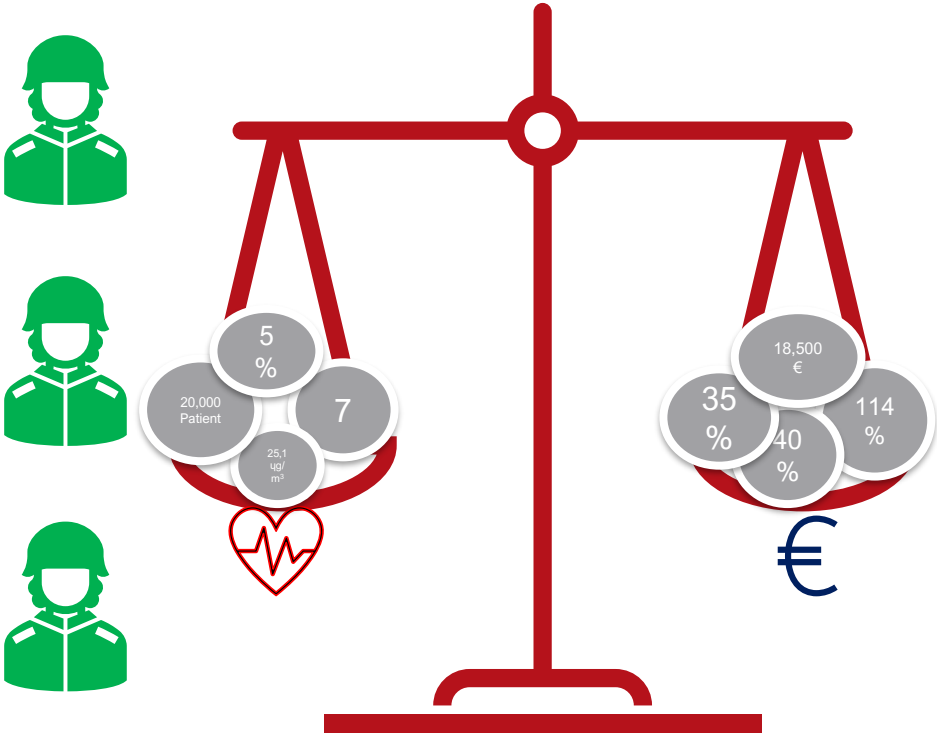
27 %

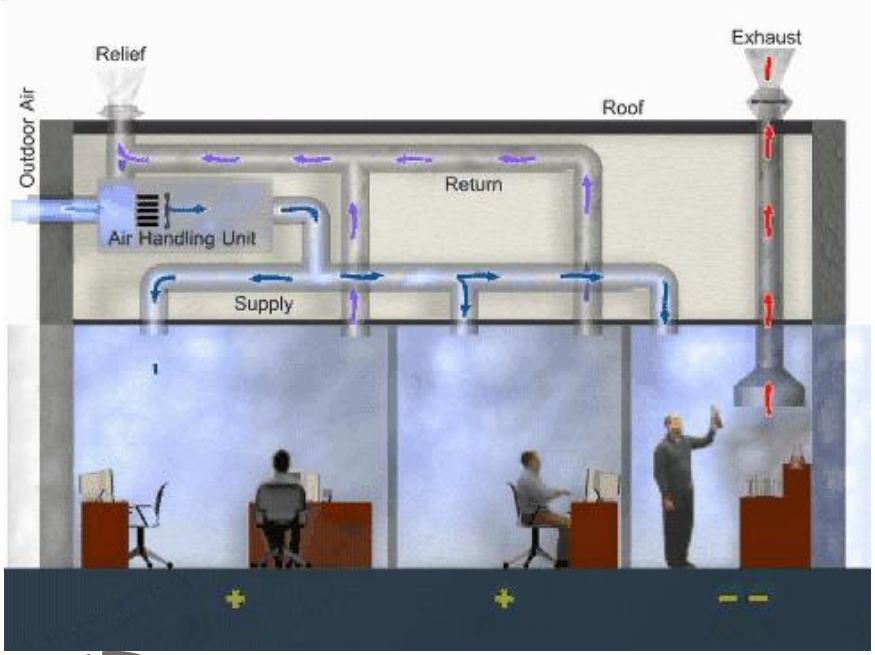
Excessive energy cost per year for 6 % deviation in HR efficiency

Facts and numbers

204 523 AHU Units
In EU in 2022

First Line of Defense for a better IAQ and Energy consumption





Presentation Point 02

Effect of AHU on Building Efficiency

AMCA European Fan Symposium 2024

Effect of AHU on Building Efficiency

+200 mm Insulation
≈ - 3 kWh/m²

+100 mm Wall
≈ - 1 kWh/m²

U-Value 1,4→1,0
≈ - 5 kWh/m²

Low speed 2,5→1,6 m/s
≈ - 7 kWh/m²

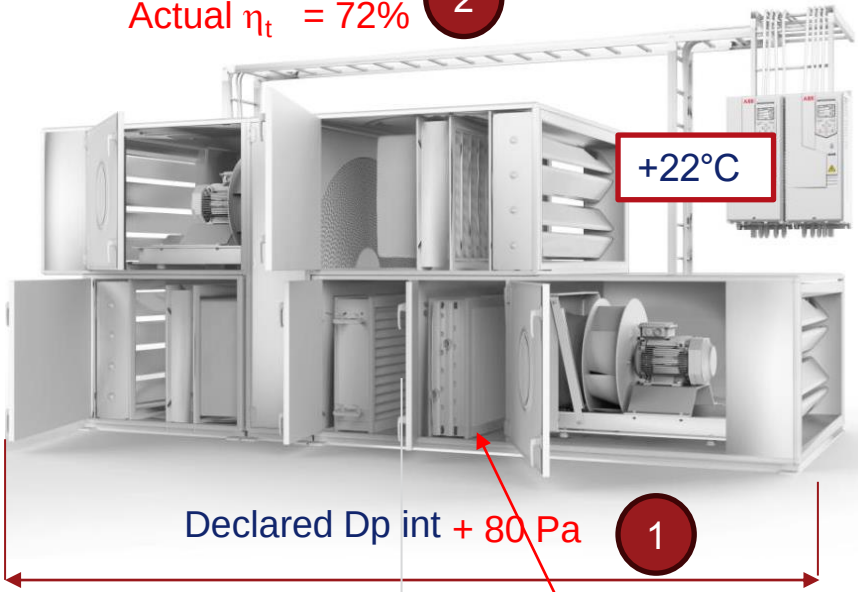
Better Efficiency
60% → 85%
≈ - 16 kWh/m²

Effect of AHU on Building Efficiency (Case Study)

Declared η_t = 78%

Actual η_t = 72%

2



Excessive heat consumption to heating up by an extra 2K

Declared temperature 15°C

Actual temperature 13°C

- Hotel (350 beds)
- The air handling unit supplies (hygienic) air to the hotel rooms
- Supply/exhaust temperature: 20°C (winter)
- Air flow rate: 10,000 m3/h (2.78 m3/s)
- Constant flow system (without DCV)
- 24/7 operation (8760 h/year)

Effect of AHU on Building Efficiency (Case Study)

1

Excess fan power consumption (80 Pa deviation):

$$P = \frac{\Delta P_t \times q}{\eta} \times 10^{-3} kW = \frac{2.78 \times 80}{0.6} \times 10^{-3} = 0.37\ kW$$

Excess annual electricity consumption (supply+exhaust)

$$E = 2 \times 0.37\ kW \times 8{,}760\ h \approx \mathbf{6{,}480\ kWh}$$

- Hotel (350 beds)
- The air handling unit supplies (hygienic) air to the hotel rooms
- Supply/exhaust temperature: 20°C (winter)
- Air flow rate: 10,000 m3/h (2.78 m3/s)
- Constant flow system (without DCV)
- 24/7 operation (8760 h/year)

Effect of AHU on Building Efficiency (Case Study)

2

Seasonal Heat Consumption of the heater:

$$Q = q_m \times \{t_{ex} - [t_{ph} + \eta_t \times (t_{ex} - t_{ph})]\} \times h_{year}$$

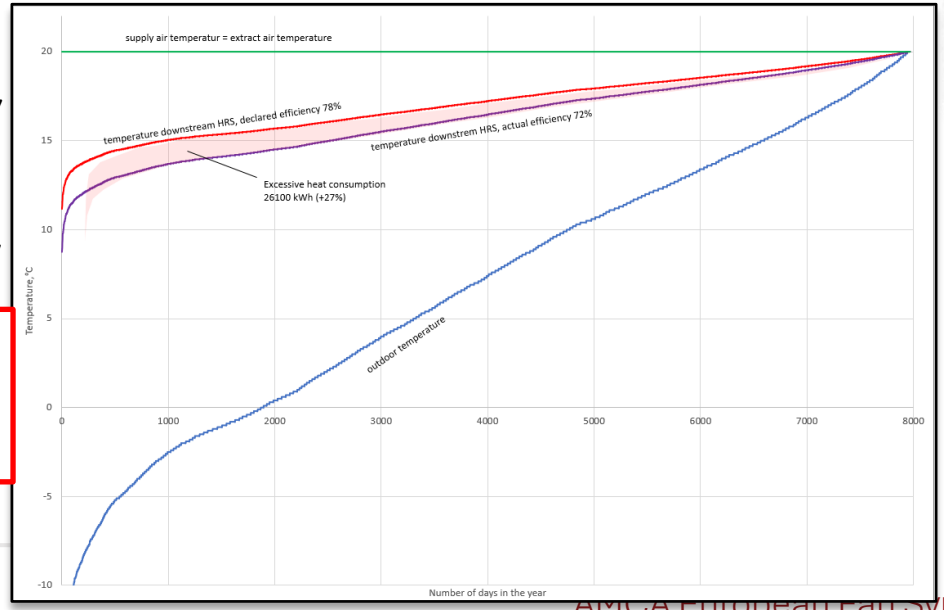
For 78% efficiency

$$Q = 72{,}200\ kWh/y$$

For 72% efficiency

$$Q = 98{,}300\ kWh/y$$

Excessive Heat Consumption ≈26,100 kWh (+27%)



- Hotel (350 beds)
- The air handling unit supplies (hygienic) air to the hotel rooms
- Supply/exhaust temperature: 20°C (winter)
- Air flow rate: 10,000 m3/h (2.78 m3/s)
- Constant flow system (without DCV)
- 24/7 operation (8760 h/year)

Effect of AHU on Building Efficiency (Case Study)

1

Excessive cost of electricity:

$$6{,}480\ kWh \times 0.495\ € / kWh = 3{,}208\ €$$

2

Excessive cost of heat (natural gas):

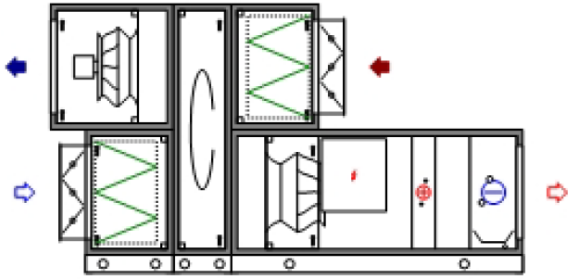
$$26{,}100\ kWh \times 0{,}223\ €/kWh = 5{,}820\ €$$

Excessive Cost ≈ 9,028 € / year

- Hotel (350 beds)
- The air handling unit supplies (hygienic) air to the hotel rooms
- Supply/exhaust temperature: 20°C (winter)
- Air flow rate: 10,000 m3/h (2.78 m3/s)
- Constant flow system (without DCV)
- 24/7 operation (8760 h/year)

Effect of AHU on Building Efficiency (Case Study)

Position	I.M.	Energy class of the air handling unit		
		A+	A	C
Electric Energy (fans)	kWh/yr.	33,285	36,368	39,778
Heating Energy (heating coil)	kWh/yr.	168	1,931	8,098
Cooling Energy (cooling coil)	kWh/yr.	9,826	10,138	10,690
Total energy cost	€ / yr.	18,705	20,694	23,880
Unit Cost difference to class A+	€ / yr.	-	1,989	5,175
Difference after 15* years to A+ class	€	-	29,832	77,626



Airflow rate (SUP/EHA): 10,000 m^3/h
Ext. Static Pres. (S/E): 400/300 Pa

Supply (S/W): 20°C

Exhaust (W): 22°C

Exhaust (S): 24°C

Rotary Heat Recovery Wheel, Water heater & cooling coils, Filter ePM1 70% (SUP), ePM10 50% (ETA) + Fans (SUP+ETA)

Location: London, 24/7 operation

Prices per kWh. Electricity 0.495 €/kWh, Gas 0,223 €/kWh (based on a SEER chiller efficiency)

HRS effic. adopted 85.5% for A+ class, 80.2% for A class & 73% for C class, respectively.

* Present values over 15 years with a rate of return @3%.

LCC calculations courtesy of FläktGroup

Presentation Point 03

How to Guarantee Performances?

AMCA European Fan Symposium 2024

Third Party Certification

COMMON AND FAIR RULES

- ✓ Common evaluation criteria
- ✓ Integrity + Impartiality
- ✓ Fairness of the ratings
- ✓ Precision and Transparency of data.

AN OBJECTIVE COMPARISON

- ✓ Certified characteristics published online

AVAILABLE ON-LINE

Eurovent Certification

The data doesn't lie

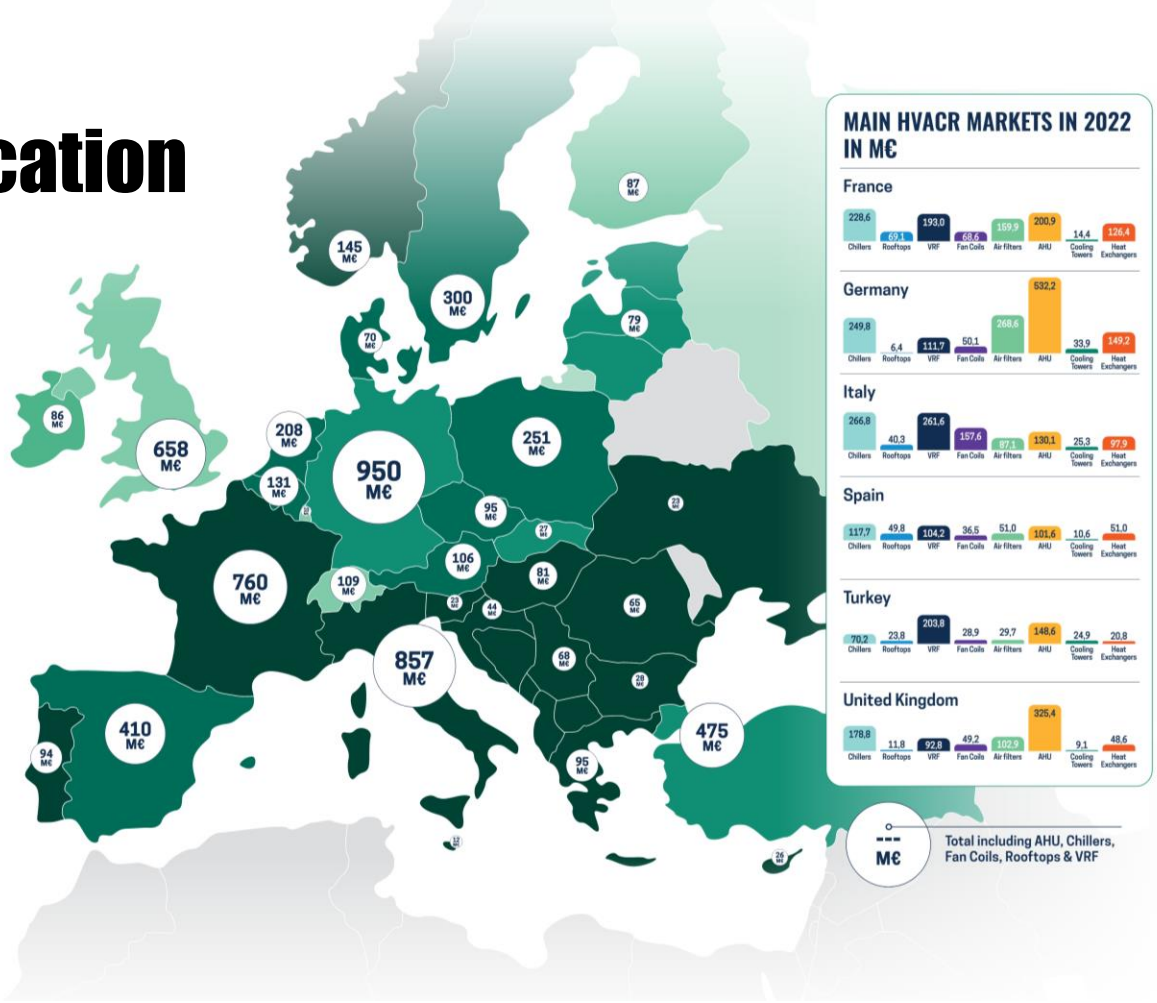
Eurovent Certita CERTIFICATION

Independent · Robust · Partner · Eurovent Certita Certification · ISO 17065:2012

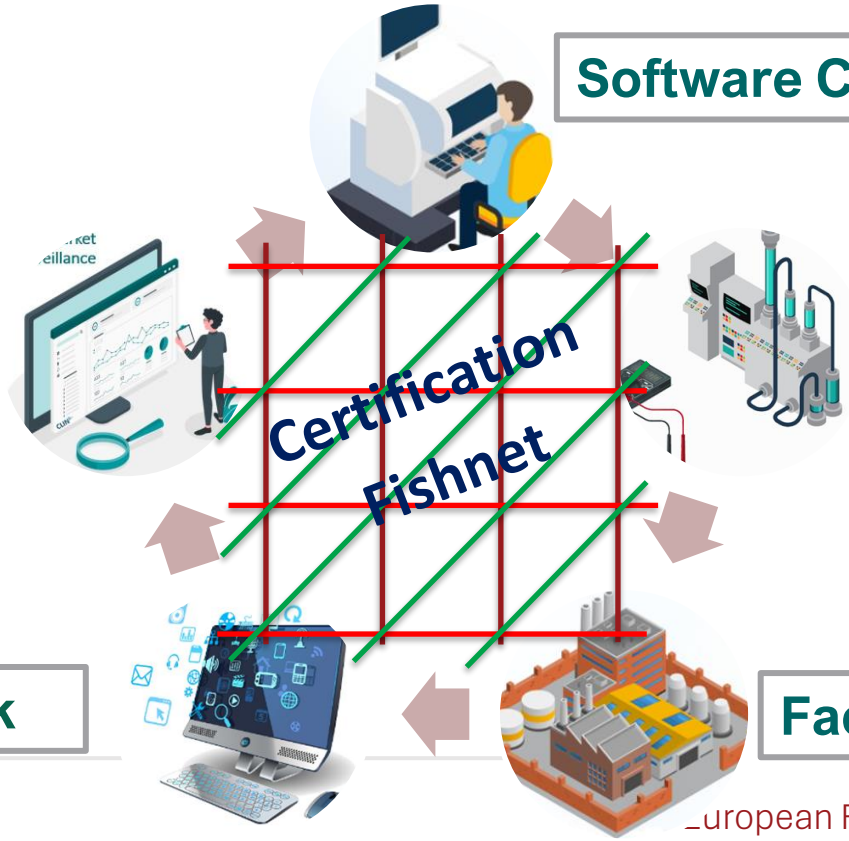
EUROVENT-CERTIFIED MARKET SHARE

- > 90%
- > 80%
- > 70%
- > 60%
- > 50%
- > 40%

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com



Performances Verification



Software Check

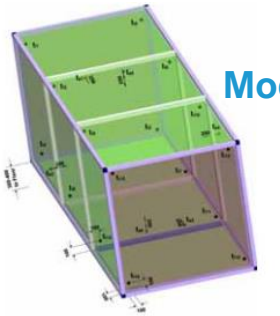
Market Surveillance

Testing laboratories

Data Check

Factory Audit

Performances Certification



Model Box (Casing)

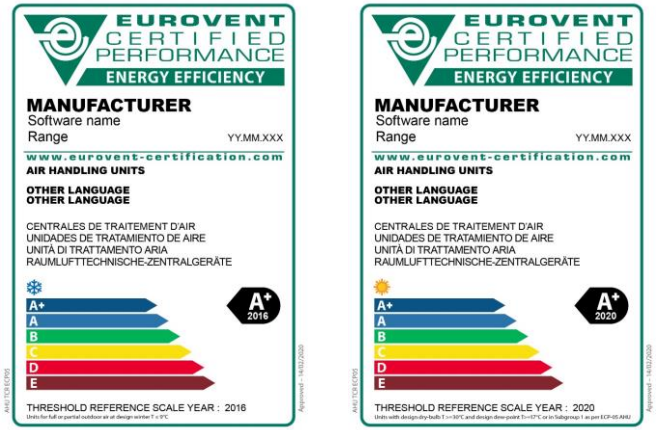
Real Unit

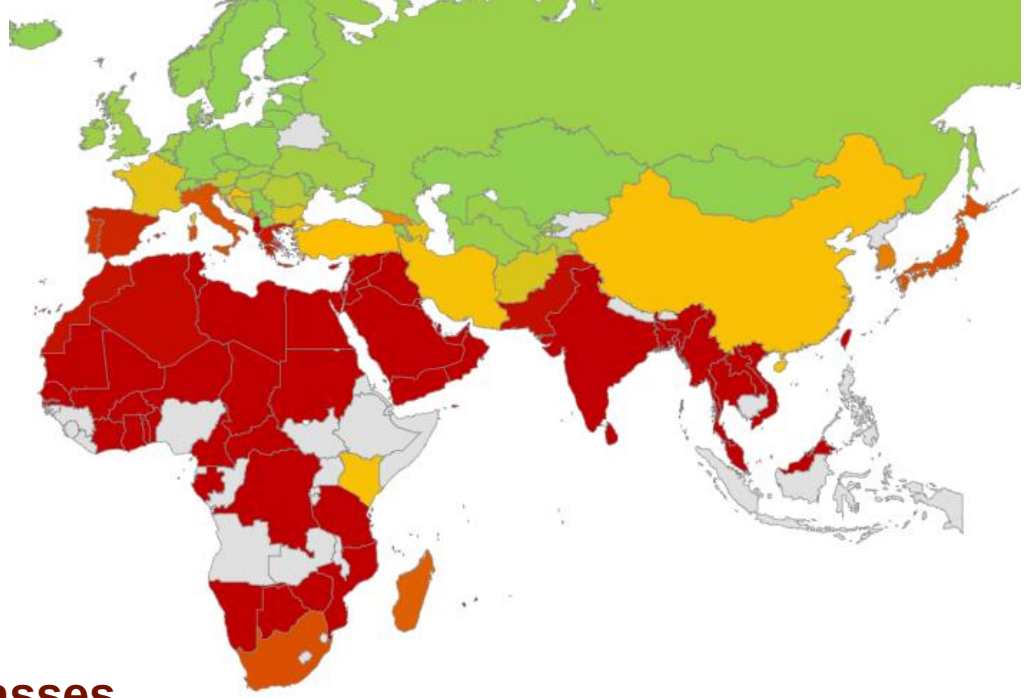
- ✓ Casing Strength (M)
- ✓ Casing air leakage (M)
- ✓ Filter bypass leakage (M)
- ✓ Thermal transmittance
- ✓ Thermal bridging factor
- ✓ Acoustical insulation of casing

- ✓ Air flow rate
- ✓ External static pressure
- ✓ Power input
- ✓ Airborne sound power level
- ✓ Heating capacity
- ✓ Cooling capacity

- ✓ Heat recovery efficiency Heat recovery Pressure drop
- ✓ OACF
- ✓ EATR

Energy Label





Reference parameters for energy classes

- → Air velocity
- → Heat recovery efficiency
- → Flow resistance (heat recovery)
- → Fan efficiency ratio

CLASS	All Units	Units for full or partial outdoor air at design winter temperature ≤ 9°C		
	Velocity	Heat recovery system		Fan Efficiency Grade
	v_{class} [m/s]	η_{class} [%]	Δp_{class} [Pa]	$NG_{ref\text{-}class}$ [-]
A+ / A+↻ / A+↑	1.4	83	250	64
A / A↻ / A↑	1.6	78	230	62
B / B↻ / B↑	1.8	73	210	60
C / C↻ / C↑	2.0	68	190	57
D / D↻ / D↑	2.2	63	170	52
E / E↻ / E↑	No calculation required			No requirement

Table 6: Table for energy efficiency calculations

The lowest classes E, E↻ and E↑ have no requirements.

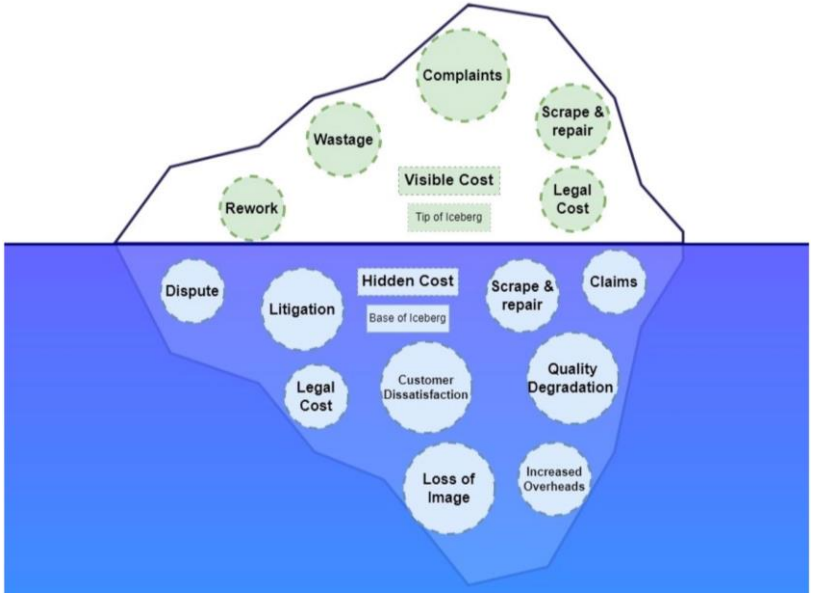
Presentation Point 04

Conclusion

Always Seek For Quality

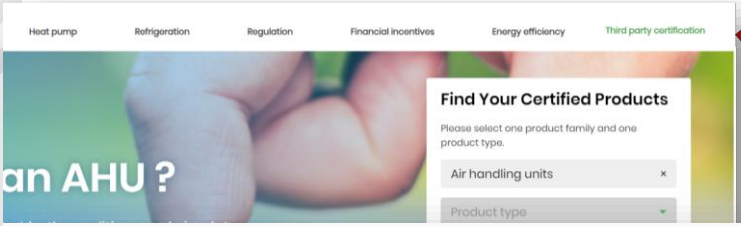
In the construction sector:

- **Hidden costs from Poor Quality can be 2 times greater than Visible costs**
- **Cost of Poor Quality can be 7 times greater than Cost of Conformance**



Source: Khadim, N., Thaheem, M.J., Ullah, F. *et al.* Quantifying the cost of quality in construction projects: an insight into the base of the iceberg. *Qual Quant* (2023). https://doi.org/10.1007/s11135-022-01574-8

Always Search for Eurovent Certified Products



Air handling units

Model box

Help | Export CSV | Download PPR | Export All Data

Navigate between your results

		Brand	Range	Model	Standard	Specifications			MB - Casing Strength	MB - Casing Air Leal
					Sub Range	Panel thickness mm	Insulation material [...	Insulation material c... W/(mK)	CS class	CAL class @-400 P
☐	PPR	AERA	EVO-COMPACT	PNL01	AZURE/EVO-C TOP/EVO-...	50	RW	0.035	D2(M)	L1(M)
☐	PPR	AERA	EVO-COMPACT	THR01	EVO-C/EVO-R	50	RW	0.035	D2(M)	L1(M)
☐	PPR	AERA	EVO-COMPACT	TLHT01	MAESTRO	50	RW	0.035	D1(M)	

EUROVENT CERTIFIED PERFORMANCE

Page 1/2

PRODUCT PERFORMANCE RATING

Document ID 1693214662-af-18325d86

Issued on: 28 August 2023 - *Délivré le : 28 août 2023*

This product is certified by Eurovent Certita Certification as mentioned on:

Ce produit est certifié par Eurovent Certita Certification comme mentionné sur :

Certificate N° 21.10.004

This document is valid at the date of issue - Check the current validity on www.eurovent-certification.com

Ce document est valide à la date d'édition - Vérifiez la date de validité sur www.eurovent-certification.com

Certification programmes / *Programmes de certification*	Air Handling Units (Air handling units)
Product type / *Type de produit*	Model box
Model name / *Nom du modèle*	PNL01
Range / *Gamme*	EVO-COMPACT
Participant / *Titulaire*	AERA Iklimlendirme Teknolojileri San. ve Tic AS
Brand / ...	AERA

This performance certificate is delivered for the following project

Project Name *Nom du projet*	Project company *Nom de la société*	Project Reference *Project Reference*	Project location *Localisation du projet*
fdsq	sqdqs	qdq	Denmark

Thank you!

Do you have any questions?

s.courtey@eurovent-certification.com