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menerga
a systemair company


Air handling
unit capacity
400m³/h
Area of premises
100m²

Γιατί είναι απαραίτητο?

1) Εξοικονόμηση ενέργειας 80-90% στον ΑΕΡΙΣΜΟ και έως 50% συνολικά στο κτίριο

- Παράθυρα ανοιχτά ή ανάκλιση?
- Ανεμιστήρας “silent” στα μπάνια και στα wc?

Γιατί είναι απαραίτητο (2)

2) Ποιότητα εσωτερικού αέρα!!!

- Έχω την σωστή ποσότητα φρέσκου αέρα σε όλους τους χώρους?
- Έχω την κατάλληλη φίλτρανση στον φρέσκο αέρα? Μικροσωματίδια, Γύρη, οσμές κτλ
- Εχω την σωστή διανομή του αέρα σε όλο το σπίτι?
- Εχω τον κατάλληλο εξαερισμό σε κουζίνες, μπάνια, αποθήκες κτλ?
- Εχω ρύθμιση στην υγρασία?
- Εχω ρύθμιση της ποσότητας αέρα με βάση τις ανάγκες της στιγμής για υγρασία ή συγκέντρωση ατόμων?

Γιατί είναι απαραίτητο (3)

ΑΣΦΑΛΕΙΑ!

Είναι ασφαλές να ανοίξω παράθυρα όταν είμαι μέσα? Νύχτα και μέρα

Είναι ασφαλές να αφήσω παράθυρα ανοιχτά ή σε ανάκλιση όταν λείπω για να μην μυρίζει το σπίτι, το γραφείο ή το εξοχικό?

Γιατί είναι απαραίτητο (4)

Μικροσωματίδια και σκόνη που μπαίνουν στα κτίρια με τα παράθυρα ανοιχτά!

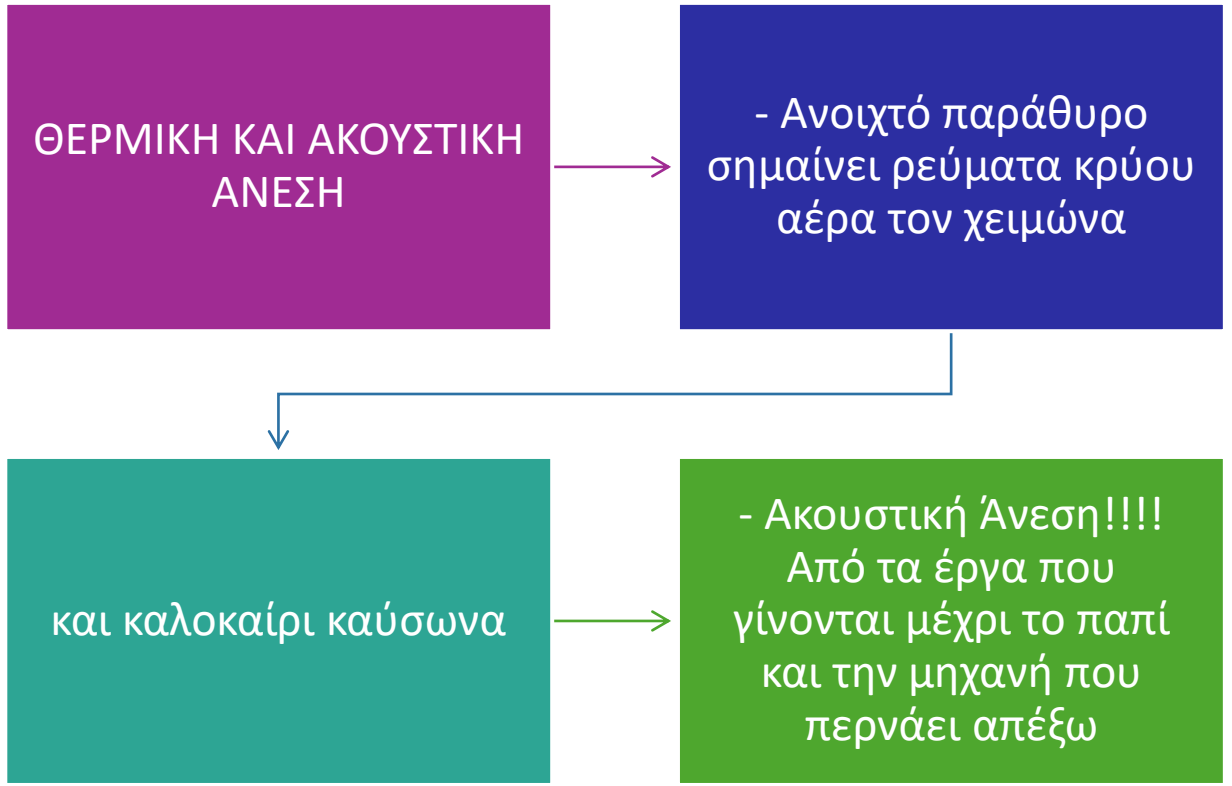
Οσμές από το περιβάλλον

Αιθαλομίχλη από τζάκια ή πυρκαγίες

Outdoor Air Quility: ***Regional Air Quality***

- Ozone
- Particulate matter
- Carbon monoxide
- Sulfur oxides
- Nitrogen dioxide and
- Lead

Γιατί είναι απαραίτητο (5)



Γιατί είναι απαραίτητο (6)

Ελαχιστοποίηση διασποράς ασθενειών

Μείωση φαινομένων υπνηλίας

Εξάλειψη πονοκεφάλων από έλλειψη οξυγόνου ή μεγάλη συγκέντρωση CO2

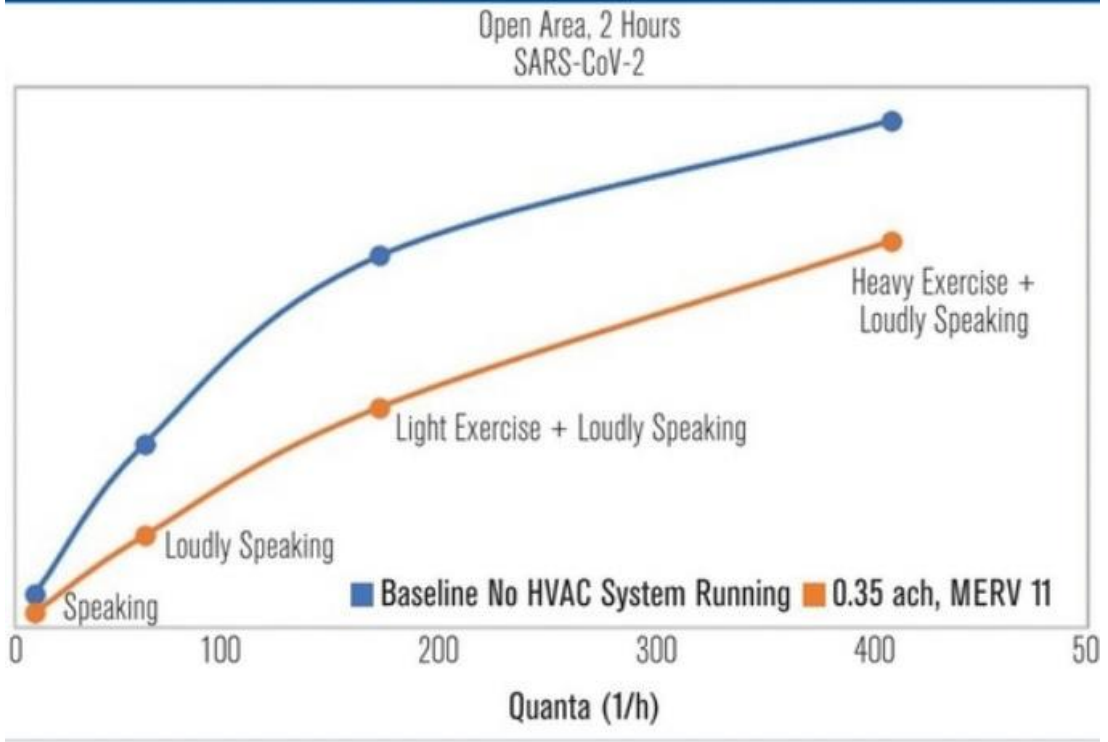
ASHRAE Journal (Paper from Dec 2020)

"Effect of Ventilation And Filtration on Viral Infection in Residences"

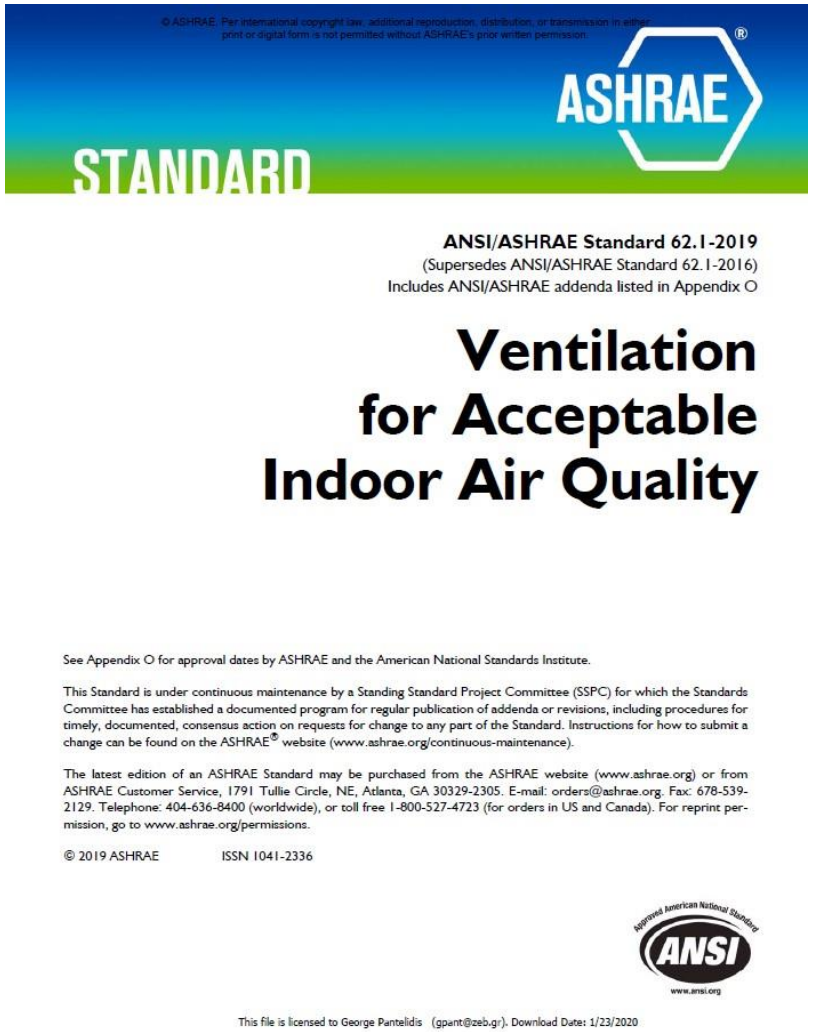
TABLE 2 Assumed filter efficiency by MERV. This filter efficiency assumes the following particle size distribution: 15% are 0.3 µm – 1 µm, 25% are 1 µm – 3 µm, and 60% are 3 µm – 10 µm.

MERV	0.3 µm – 1 µm	1 µm – 3µm	3 µm – 10 µm	DROPLET NUCLEI-WEIGHTED η_{FILTER}
4	1%	9%	15%	11%
7	17%	46%	50%	44%
11	30%	65%	85%	72%
13	70%	90%	90%	87%
14	80%	90%	90%	89%
15	90%	90%	90%	90%
16	95%	95%	95%	95%

E 5 Absolute infection risk comparing different activities.



ASHRAE Ventilation Standards **62.1** & **62.2**



STANDARD

ASHRAE

ANSI/ASHRAE Standard 62.1-2019
(Supersedes ANSI/ASHRAE Standard 62.1-2016)
Includes ANSI/ASHRAE addenda listed in Appendix O

Ventilation for Acceptable Indoor Air Quality

See Appendix O for approval dates by ASHRAE and the American National Standards Institute.

This Standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. Instructions for how to submit a change can be found on the ASHRAE® website (www.ashrae.org/continuous-maintenance).

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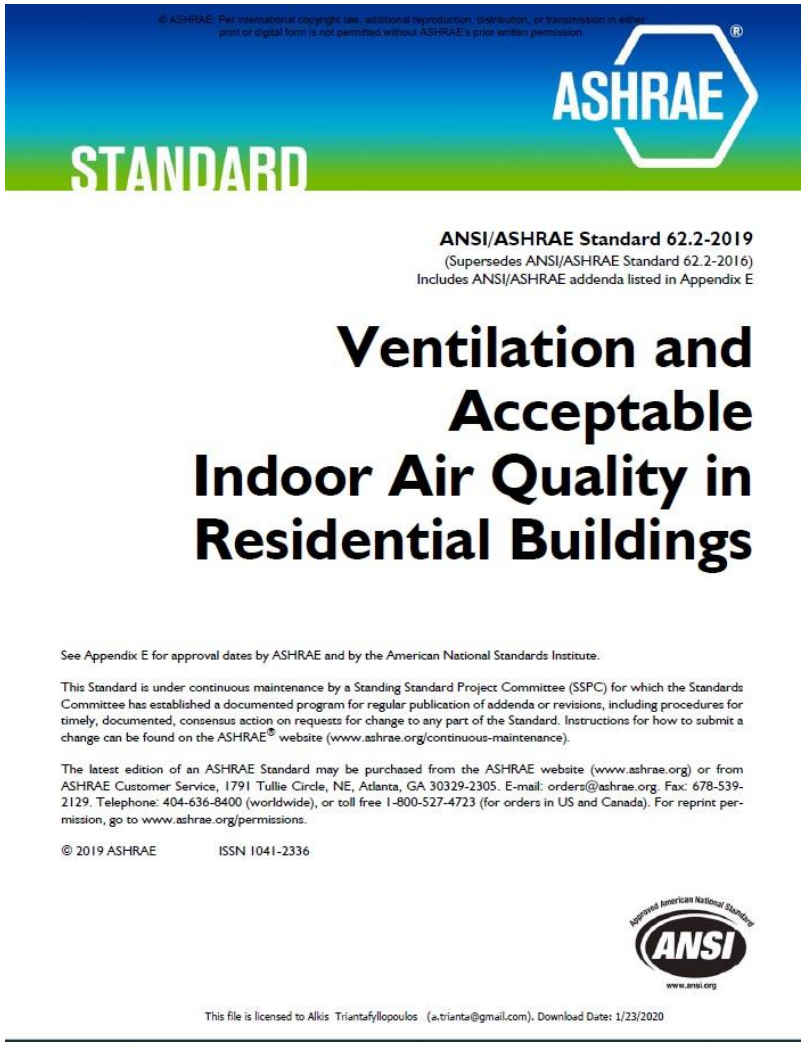

STANDARD

ASHRAE

ANSI/ASHRAE Standard 62.2-2019
(Supersedes ANSI/ASHRAE Standard 62.2-2016)
Includes ANSI/ASHRAE addenda listed in Appendix E

Ventilation and Acceptable Indoor Air Quality in Residential Buildings

See Appendix E for approval dates by ASHRAE and by the American National Standards Institute.

This Standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. Instructions for how to submit a change can be found on the ASHRAE® website (www.ashrae.org/continuous-maintenance).

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Table 6-1 Minimum Ventilation Rates in Breathing Zone *(Continued)*

Occupancy Category	People Outdoor Air Rate R_p		Area Outdoor Air Rate R_a		Default Values
					Occupant Density
	cfm/ person	L/s· person	cfm/ft^2	L/s·m^2	#/1000 ft^2 or #/100 m^2
Educational Facilities (continued)					
University/college laboratories	10	5	0.18	0.9	25
Wood/metal shop	10	5	0.18	0.9	20
Food and Beverage Service					
Bars, cocktail lounges	7.5	3.8	0.18	0.9	100
Cafeteria/fast-food dining	7.5	3.8	0.18	0.9	100
Kitchen (cooking)	7.5	3.8	0.12	0.6	20
Restaurant dining rooms	7.5	3.8	0.18	0.9	70
Food and Beverage Service, General					
Break rooms	5	2.5	0.06	0.3	25
Coffee stations	5	2.5	0.06	0.3	20
Conference/meeting	5	2.5	0.06	0.3	50

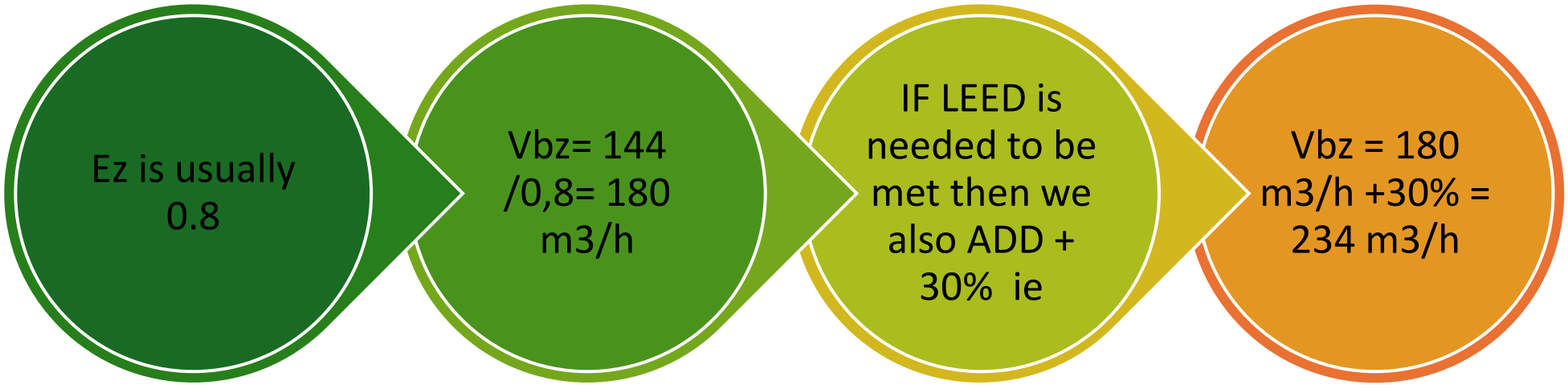
Example

- House 100 m2, with 4 occupants
- Vbz = Vp + Va
- Vbz=(Rp x Pz) + (Ra x Az) =(2.5 l/s/person x 4) + (0.3 l/s/m2 x 100 m2)= 40 l/s x 3.6 = 144 m3/h

Table 6-4 Zone Air Distribution Effectiveness

Air Distribution Configuration	E_z
Well-Mixed Air Distribution Systems	
Ceiling supply of cool air	1.0
Ceiling supply of warm air and floor return	1.0
Ceiling supply of warm air 15°F (8°C) or more above space temperature and ceiling return	0.8
Ceiling supply of warm air less than 15°F (8°C) above average space temperature where the supply air-jet velocity is less than 150 fpm (0.8 m/s) within 4.5 ft (1.4 m) of the floor and ceiling return	0.8
Ceiling supply of warm air less than 15°F (8°C) above average space temperature where the supply air-jet velocity is equal to or greater than 150 fpm (0.8 m/s) within 4.5 ft (1.4 m) of the floor and ceiling return	1.0
Floor supply of warm air and floor return	1.0
Floor supply of warm air and ceiling return	0.7
Makeup supply outlet located more than half the length of the space from the exhaust, return, or both	0.8

Zone Air Distribution Effectiveness (**Ez**)


Ez is usually 0.8
Vbz= 144 /0,8= 180 m3/h
IF LEED is needed to be met then we also ADD + 30% ie
Vbz = 180 m3/h +30% = 234 m3/h

ASHRAE Standard 119 (1988) defines normalized leakage and also specifies tightness levels based on energy conservation concerns. Here in, we are concerned with the metric (Normalized Leakage) that is used in the ASHRAE Standards and the standardized infiltration model based on it.

ASHRAE Standard 136 (1993) uses pre-calculated weather factors and the airtightness measured using normalized leakage (of Standard 119) to estimate the impact that infiltration would have on indoor air quality and thus determine its equivalent ventilation.

Εξαερισμός - Exhaust Ventilation!

- Kitchen- Κουζίνα
- Bathroom- Μπάνιο
- WC

Table 6-2 Minimum Exhaust Rates

Occupancy Category	Exhaust Rate, cfm/unit	Exhaust Rate, cfm/ft^2	Notes	Exhaust Rate, L/s·unit	Exhaust Rate, L/s·m^2	Air Class
Shower rooms	20/50		G,I	10/25		2
Paint spray booths	—	—	F	—	—	4
Parking garages	—	0.75	C	—	3.7	2
Pet shops (animal areas)	—	0.90	—	—	4.5	2
Refrigerating machinery rooms	—	—	F	—	—	3
Residential kitchens	50/100	—	G	25/50	—	2
Soiled laundry storage rooms	—	1.00	F	—	5.0	3
Storage rooms, chemical	—	1.50	F	—	7.5	4
Toilets—private	25/50	—	E, H	12.5/25	—	2
Toilets—public	50/70	—	D, H	25/35	—	2

Kitchen: (3.8 l/s/person x 1)+(15m2 x 0.6 l/s/m2)+ =94 l/s x 3.6= 340 m3/h

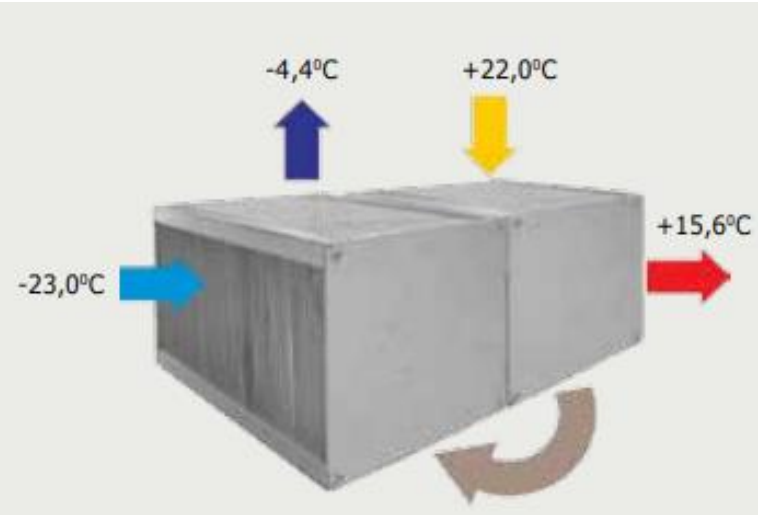
Residential Kitchen: 50 l/s/unit =180 m3/h

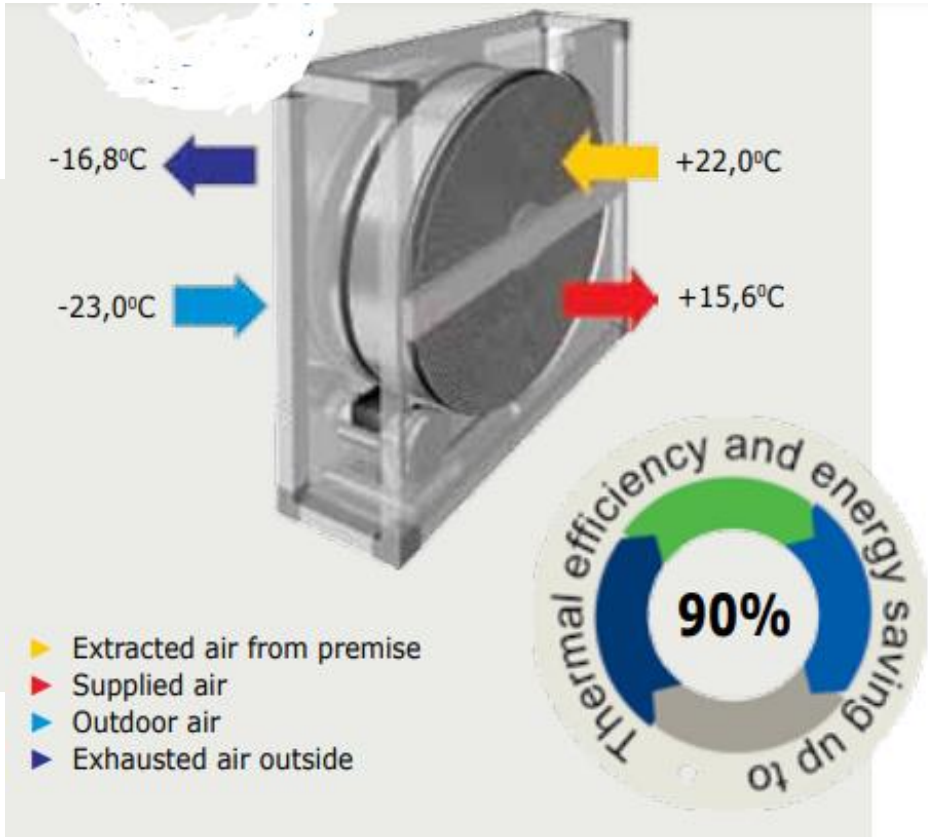
Bathroom/Shower : 25 l/s/unit =90m3/h

WC/ Toilet: 25 l/s/unit = 90 m3/h

Centralized Ventilation Systems

Heat/Energy Recovery



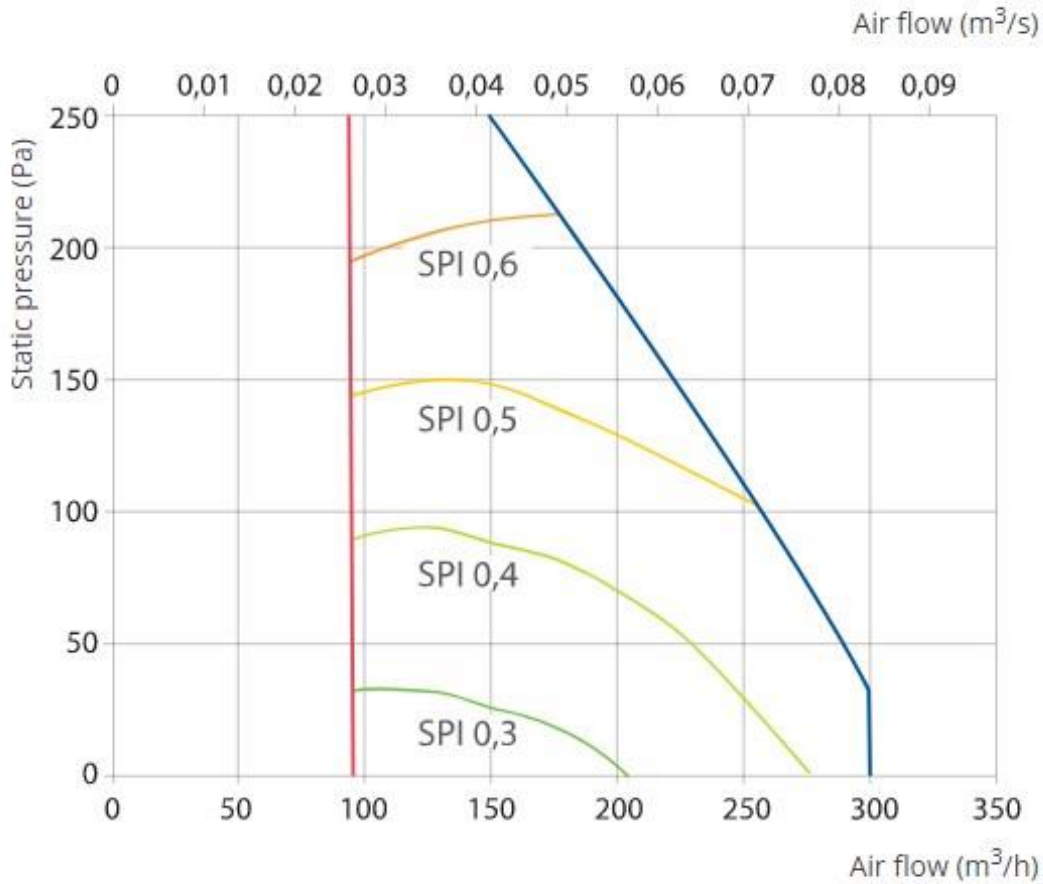


Minimum Air Filters

- Usually 2 or 3 Air Filters
- Supply Air : ISO ePM1 55% (F7) or greater
- Fresh Air: ISO ePM10 60% (M5) or greater
- Return Air: ISO ePM10 60% (M5) or greater

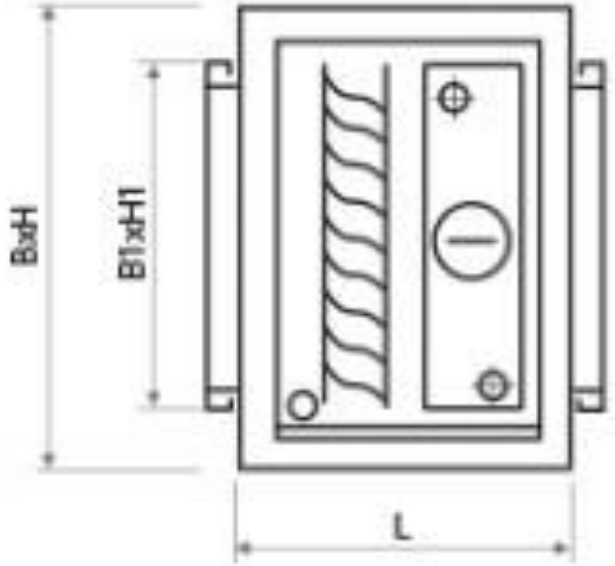
Performance Data

Performance

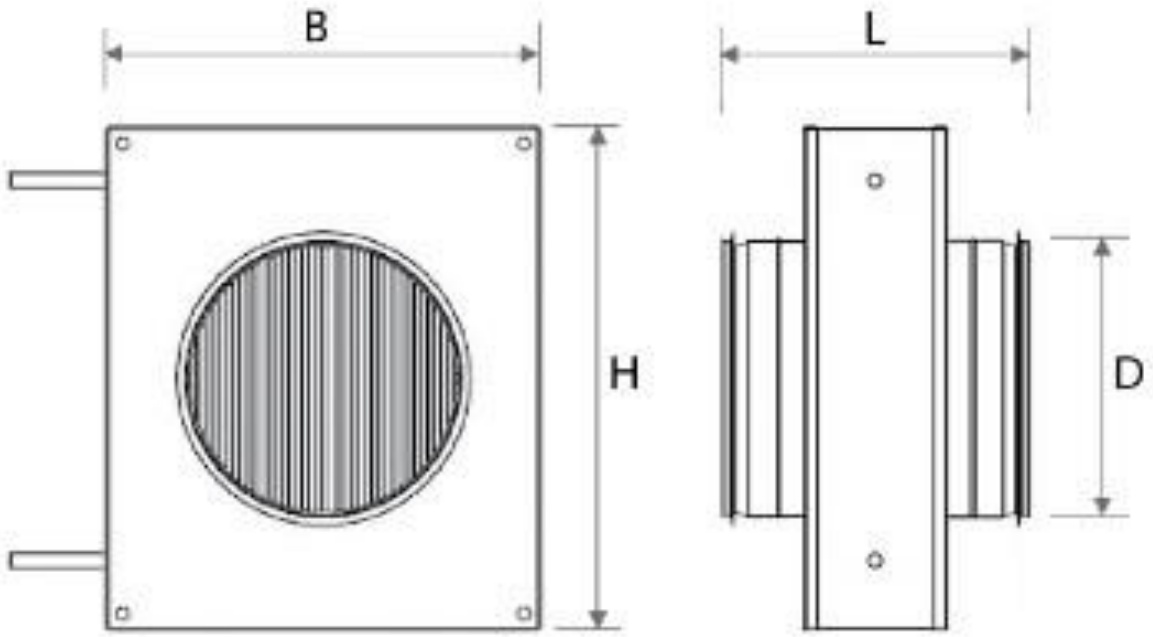


Cooler (Water or DX)

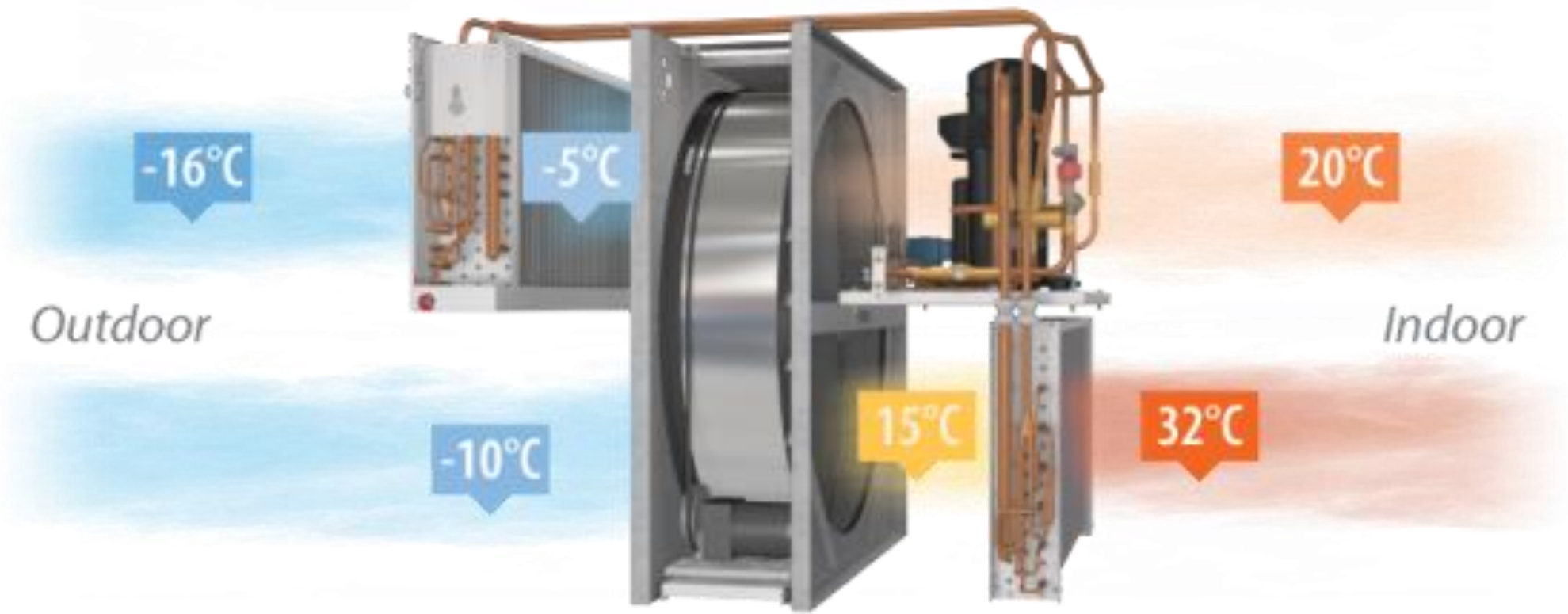
- Refrigerant type – R410A, water 7/12.
  Air temperature in/out – 30/18 °C



Water Heater (or Combi)



Package Units (compressor integrated)



Ηχοαποσβεστήρες

- Μονάδες για κουζίνα

Demand Control Ventilation (VAV)

PRESENCE SENSOR

CO2 SENSOR

HUMIDITY SENSOR

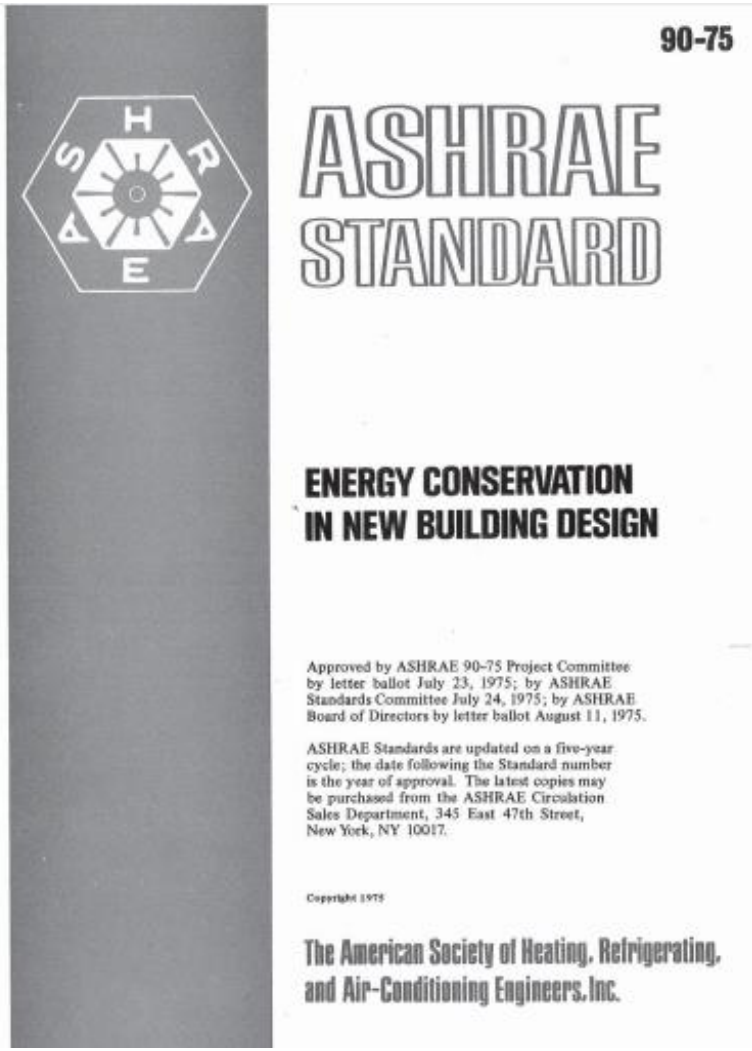
Decentralized Ventilation

1-way decentralized (unbalanced)

Tech Details

Wall opening [mm]:	Ø 270
Minimum wall thickness incl. plaster [mm]:	260
Luftvolumenstrom [m³/h]:	10 - 45
Air volume flow [m³/h]:	20 - 90
Exhaust air volume flow [W]:	1 - 5
Heat recovery[%]:	88
Volume flow related electr. fan output [W/(m³/h)]:	0,11 - 0,16
Fan voltage [V DC]:	6 - 16
Weather protection hood [B x H,mm]:	279 x 313
Inner cover [B x H,mm]:	280 x 280
Range of application:	-20 °C - 50 °C
Standard sound level difference [dB]:	43 - 52
Sound pressure level 1 m [dB(A)]:	20 - 47
Energy efficiency class:	A+ / A

ASHRAE since 1895



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