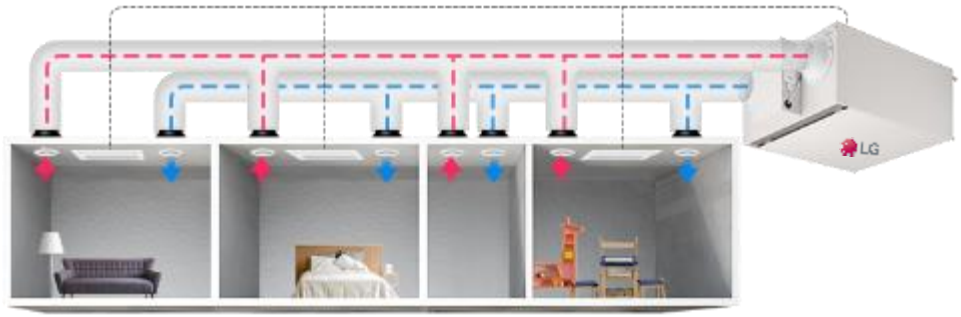
Ventilation Care to make my home breathe properly

LG Residential *ERV*

(Energy Recovery Ventilation)



Contents

Intro

- Needs for Ventilation
- Line-up
- Necessity of ERV
- Why LG?
- Composition of LG Residential ERV

Ventilation,

Why do you need it?

Need for Ventilation ① Increasing Time Indoors

Due to COVID-19 pandemic, time spent indoors for working and living has been increased.

Increasing Home Stay Time

Due to COVID-19 pandemic, the time spent at home has been increasing especially for the elderly, children, and housewives.

Enhancing Airtightness of the New Constructed Building

With the development of building technologies, airtightness has been improved and makes natural ventilation more difficult.

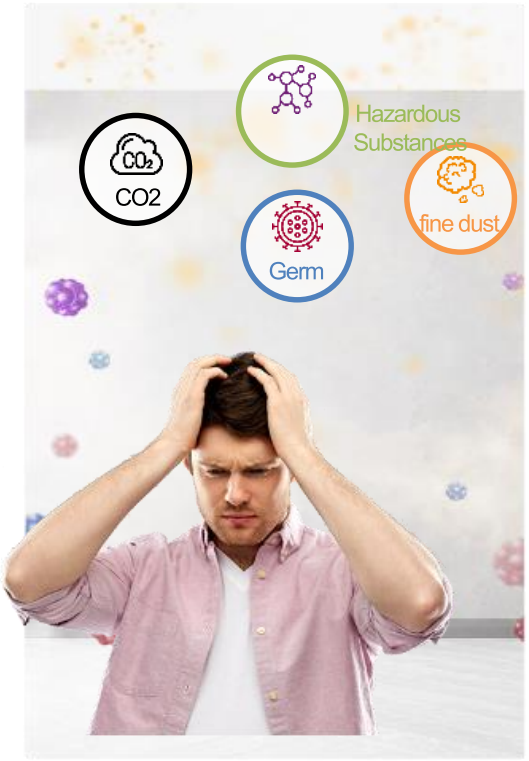
Need for Ventilation ② - Discharge of Hazardous Substances

Indoor air contains both fine dust and viruses such as cold, COVID-19, bacteria, mold, and harmful gases from building materials like interiors and furniture.

Indoor fine dust can be removed with an air purifier, and other harmful substances must be discharged outdoors through ventilation system.

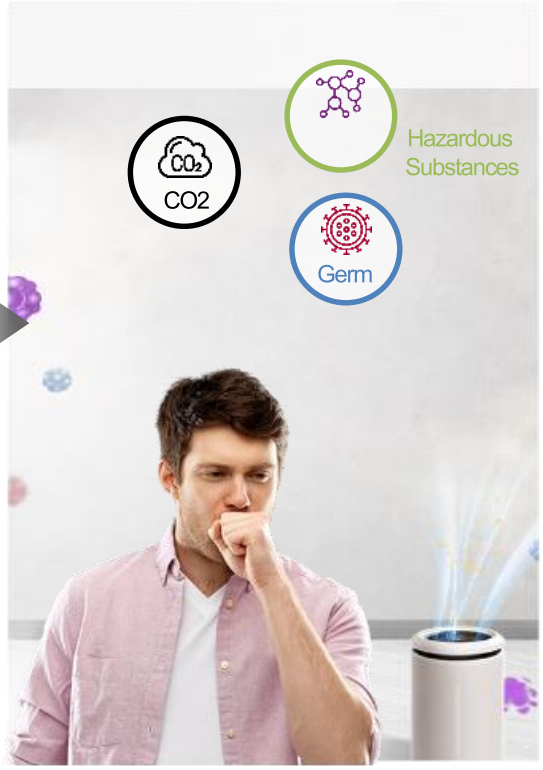
Neither air purifier nor ventilation is operated.

It is a mixture of fine dust and harmful substances.



Air purifier is running.

Fine dust is removed, but harmful substances remain.



Both air purifier and ventilation are operated.

Fine dust and harmful substances are removed.

Line-up

LG provides flexible line up of ERV(Energy Recovery Ventilation)

Line up of LG ERV

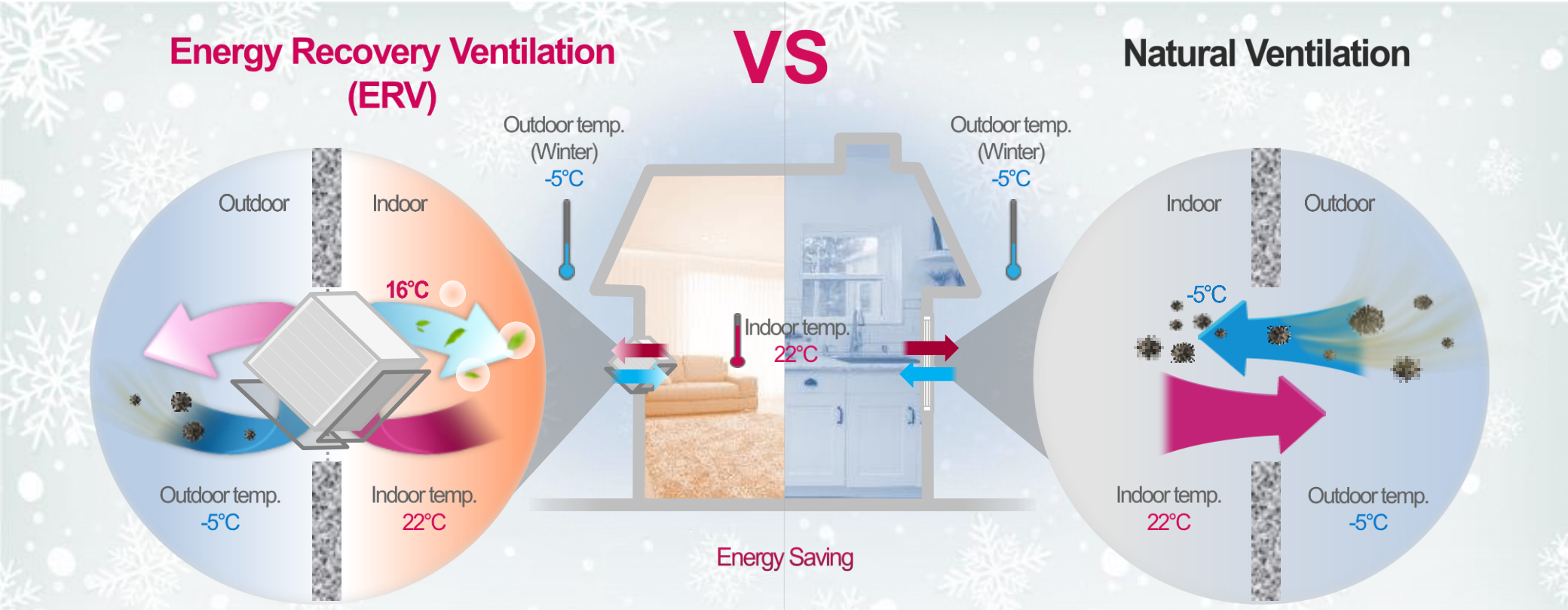
Cat.	Image	150	200	250	350	500	800	1000	1500	2000	(CMH)
ERV				○	○	○	○	○	○	○	
	NEW 	●	●								

○ Existing line-up

● Residential

Necessity of ERV(Energy Recovery Ventilation)

Natural ventilation is caused an energy loss in cooling and heating, when exhausting the indoors polluted air.
Heat exchanger in ERV collects energy in cooling and heating for energy saving while supplying fresh air.



Comfort air + Energy saving

Compared to natural ventilation

Heat exchanger collects wasted energy while ventilating.

Natural ventilation's heat energy loss.

Ventilation System,

Why LG?

Why LG?

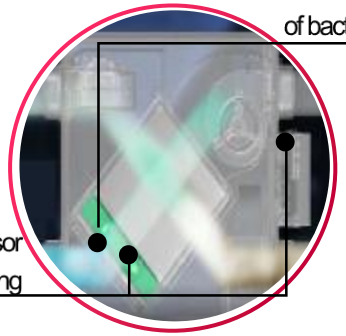
It is equipped with ultra-fine dust filters, highly efficient total heat exchangers, quiet operation, healthy air quality management, various operation controls, artificial intelligence operation in conjunction with LG air conditioners, and easy filter replacement .

Clean Air

ePM1 95% Filter

Pre-filter UV sterilization, Air passage of bacterial /mold resistant material

Dual fine dust PM1.0 sensor
CO2 concentration monitoring

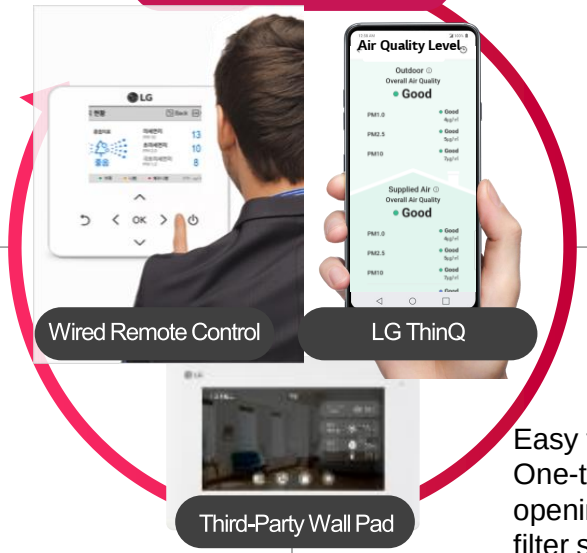


Energy Saving

Highly Efficient
Total Heat Exchanger

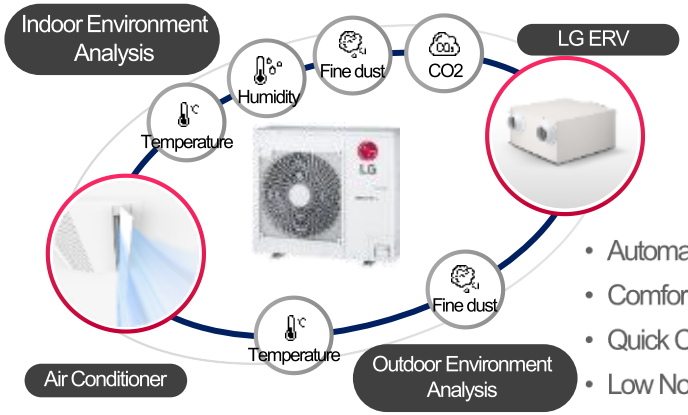
- Seasonal Auto Operation
- CO_2 Auto Operation
- Delay Operation
- Night Time Free Cooling

Smart Controls



Comfort

Artificial intelligence finds the optimal operating conditions for air conditioner and ventilation and controls it by itself



- Automatic Control by the Environment
- Comfortable Ventilation
- Quick Cleaning with Air Purification
- Low Noise

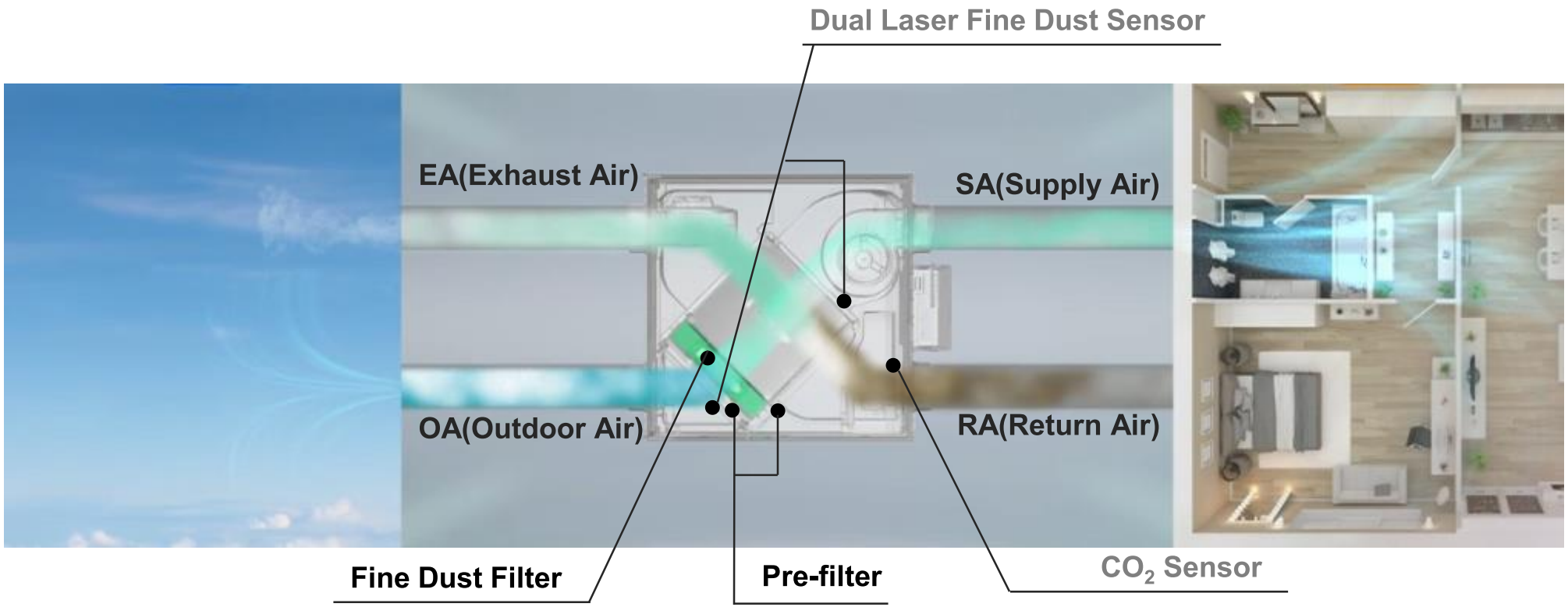
Convenience

Easy filter replacement -
One-touch button cover opening and drawer-type filter separation structure

- Filter Maintenance Alarm
- Easy Filter Maintenance
- Convenient Design Program

Composition of LG Residential ERV

Supply and exhaust air flows are completely separated in the heat exchanger, allowing the LG Residential ERV to filter out impurities before supplying outdoor air to ensure indoor air is fresh and healthy.



Clean Air

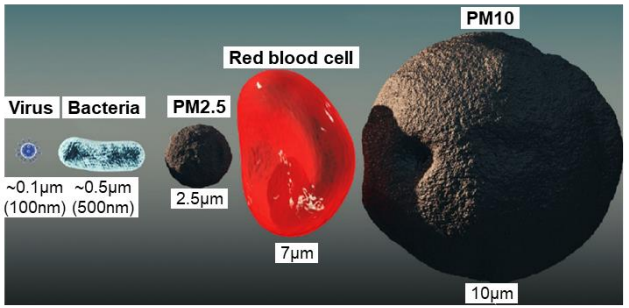
- NEW Reliable Fine Dust Filtering
- NEW Pre-filter UV Sterilization
- NEW Bacterial/Mold resistant material Air Passage
- NEW Dual Fine Dust PM1.0 Sensor Monitoring
- NEW Indoor CO2 Monitoring

Reliable Fine Dust Filtering

It is equipped with an ePM_1 95% fine dust filter **that filters fine dust with a particle size of 0.3㎛**, so it ventilates enough even on days with a lot of fine dust.

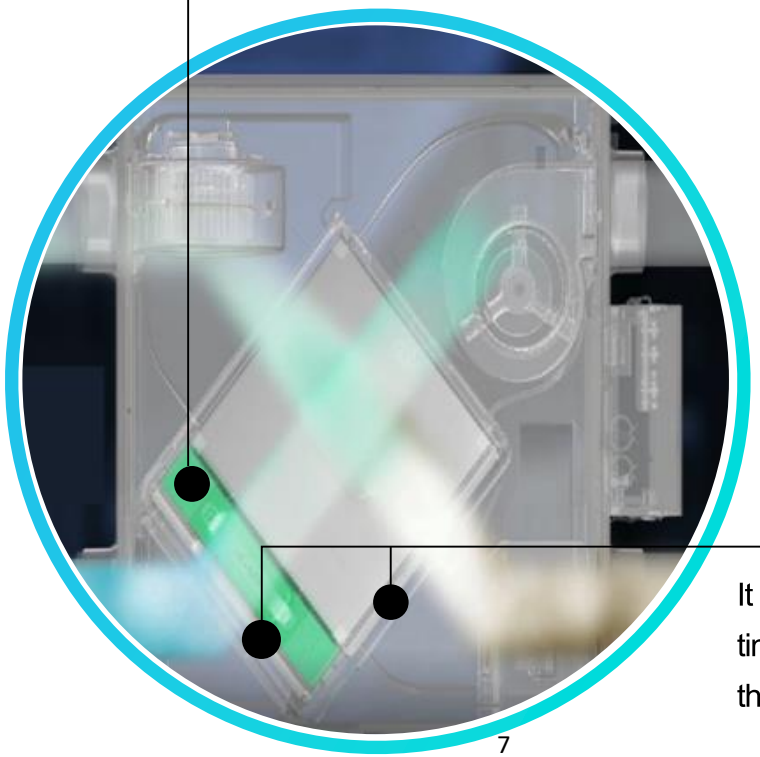
The pre-filters at both ends of the total heat exchanger filter out large dust and keep the total heat exchange efficiency for a long time.

■ **Superfine dust (PM1.0)**
It means dust less than 1.0 ㎛ in diameter. It penetrates not only the lungs but also the blood, which can cause long term health problems.



01 Fine Dust Filter

ePM1 95% dust filter filters fine dust with a particle size of 0.3㎛.*



Pre-filter 02

It keeps the total heat exchanger efficiency for a long time by filtering out large dust in the air coming in from the outside and air coming out of the room

ePM_1 95% Filter

The new ISO 16890 standard in effect, since late 2016, has superseded the old European standard EN 779 in mid 2018

Summary

- ISO 16890 Standard provides lab evaluation procedures which more realistically simulate actual operating conditions, replacing EN 779 Standard's filter classes G1-F9 by a classification system based on particulate groups PM1, PM2.5 and PM10.
- Unlike EN 779 Standard which specifies Filter Classes, ISO 16890 Standard classifies according to Filter Groups, evaluating a filter's performance by its arrestance of particles from 0.3µm to 10µm in size. Filter Group PM1 comprises particulate sizes ≤ 1.0µm, PM2.5 includes particulates sizes ≤ 2.5µm and PM10 covers particulate sizes ≤ 10µm.
- Minimum efficiency is defined as the efficiency achieved following electrostatic discharge of the filter before testing.
- Average efficiency is calculated by averaging the filter's efficiencies in the untreated state (before electrostatic discharge) and in the discharged state.

**These same particulate categories are used by the WHO in evaluation of environmental air quality
**[Source] https://www.emw.de/en/filter-campus/iso-16890-replaces-en-779.html

Filter Classes

**ePM : efficiency Particulate Matter

Filter Group	Particulate Size(µm)	Classification Criteria
ISO ePM_1	0.3 ≤ x ≤ 1	Minimum Efficiency ≥ 50%
ISO $ePM_{2.5}$	0.3 ≤ x ≤ 2.5	Minimum Efficiency ≥ 50%
ISO ePM_{10}	0.3 ≤ x ≤ 10	Average Efficiency ≥ 50%
ISO Coarse	0.3 ≤ x ≤ 10	Average Efficiency < 50%

Comparison of Filter Classes

EN 779	ISO 16890 (Average Efficiency)			
Filter Class	ePM_1	$ePM_{2.5}$	ePM_{10}	Coarse
G1	-	-	-	-
G2	-	-	-	30% ~ 50%
G3	-	-	-	45% ~ 65%
G4	-	-	-	60% ~ 85%
M5	5% ~ 35%	10% ~ 45%	40% ~ 70%	80% ~ 95%
M6	10% ~ 40%	20% ~ 50%	45% ~ 80%	> 90%
F7	40% ~ 65%	50% ~ 75%	80% ~ 90%	> 95%
F8	65% ~ 90%	75% ~ 95%	90% ~ 100%	> 95%
F9	80% ~ 90%	85% ~ 95%	90% ~ 100%	> 95%

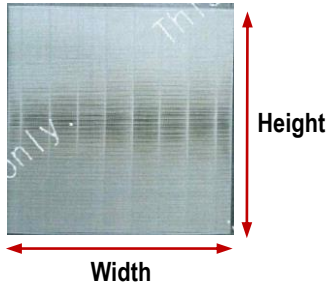
**[Source] https://www.emw.de/en/filter-campus/comparison-of-filter-classes.html

ePM_1 95% Filter

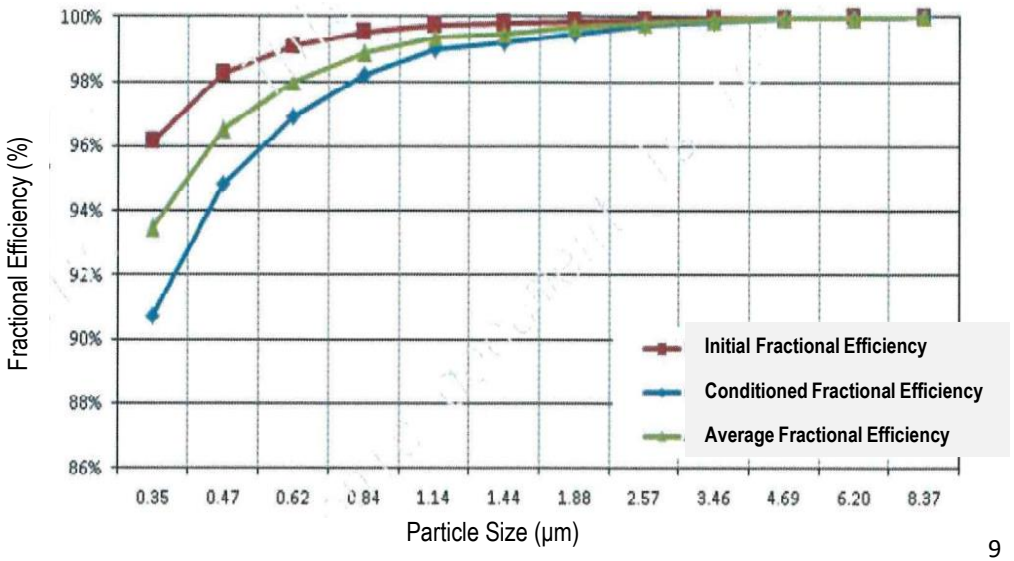
ePM_1 95% filtering capability rating in accordance with ISO 16890

Test Conditions

Air Flow Rate (m^3/s)	0.72
Test Aerosol Type	KCl
Dimension (W x H x D, mm)	600 x 600 x 50
Face Velocity (m/s)	1.0
Final Pressure Drop (Pa)	-
Temperature (°C)	23±5
Relative Humidity (%)	45±10



Fractional Efficiency Curve



Fractional Efficiency by Particle Size

Particle Size (µm)	Initial Fractional Efficiency	Conditioned Fractional Efficiency	Average Fractional Efficiency
0.30~0.40	96 %	91 %	**93 %**
0.40~0.55	98 %	95 %	**97 %**
0.55~0.70	99 %	97 %	**98 %**
0.70~1.00	100 %	98 %	**99 %**
1.00~1.30	100 %	99 %	**99 %**
1.30~1.60	100 %	99 %	**99 %**
1.60~2.20	100 %	99 %	**100 %**
2.20~3.00	100 %	100 %	**100 %**
3.00~4.00	100 %	100 %	**100 %**
4.00~5.50	100 %	100 %	**100 %**
5.00~7.00	100 %	100 %	**100 %**
7.00~10.0	100 %	100 %	**100 %**

ePM_1 95% Filter

ePM_1 95% filtering capability rating in accordance with ISO 16890.

Test Results

	Efficiency	
ePM_1 95% Index	ISO $ePM_{1\ min.}$	95.0%
	ISO $ePM_{2.5\ min.}$	96.0%
	ISO ePM_1	96.0%
	ISO $ePM_{2.5}$	97.0%
	ISO ePM_{10}	99.0%
	ePM_1 95%	

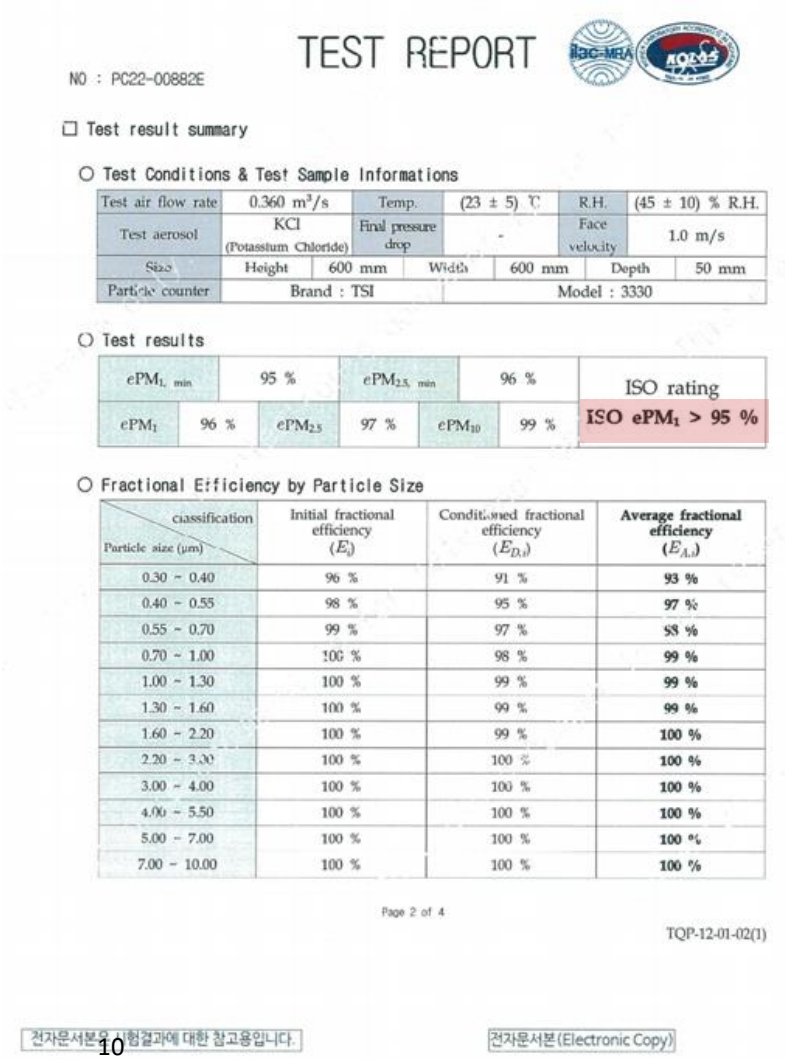
- As the test results of the ePM_1 and $ePM_{2.5}$ do not respectively meet the criteria of the minimum efficiency, it is marked ePM_1 95%

  **ePM_1 minimum efficiency ≥ 50%
  **$ePM_{2.5}$ minimum efficiency ≥ 50%

EN 779	ISO 16890 (Average Efficiency)			
Filter Class	ePM_1	$ePM_{2.5}$	ePM_{10}	Coarse
G1	-	-	-	-
G2	-	-	-	30% ~ 50%
G3	-	-	-	45% ~ 65%
G4	-	-	-	60% ~ 85%
M5	5% ~ 35%	10% ~ 45%	40% ~ 70%	80% ~ 95%
M6	10% ~ 40%	20% ~ 50%	45% ~ 80%	> 90%
F7	40% ~ 65%	50% ~ 75%	80% ~ 90%	> 95%
F8	65% ~ 90%	75% ~ 95%	90% ~ 100%	> 95%
F9	80% ~ 90%	85% ~ 95%	90% ~ 100%	> 95%

Certified Test Report

**Tested by KCL (Korea Conformity Laboratories)



TEST REPORT

NO : PC22-00882E

☐ Test result summary

○ Test Conditions & Test Sample Informations

Test air flow rate	0.360 m³/s	Temp.	(23 ± 5) ℃	R.H.	(45 ± 10) % R.H.
Test aerosol	KCl (Potassium Chloride)	Final pressure drop	-	Face velocity	1.0 m/s
Size	Height 600 mm	Width 600 mm		Depth	50 mm
Particle counter	Brand : TSI		Model : 3330		

○ Test results

$ePM_{1,\ min}$	95 %	$ePM_{2.5,\ min}$	96 %			ISO rating
ePM_1	96 %	$ePM_{2.5}$	97 %	ePM_{10}	99 %	ISO ePM_1 > 95 %

○ Fractional Efficiency by Particle Size

classification / Particle size (μm)	Initial fractional efficiency (E_0)	Conditioned fractional efficiency ($E_{D,t}$)	Average fractional efficiency ($E_{A,t}$)
0.30 ~ 0.40	96 %	91 %	93 %
0.40 ~ 0.55	98 %	95 %	97 %
0.55 ~ 0.70	99 %	97 %	98 %
0.70 ~ 1.00	100 %	98 %	99 %
1.00 ~ 1.30	100 %	99 %	99 %
1.30 ~ 1.60	100 %	99 %	99 %
1.60 ~ 2.20	100 %	99 %	100 %
2.20 ~ 3.00	100 %	100 %	100 %
3.00 ~ 4.00	100 %	100 %	100 %
4.00 ~ 5.50	100 %	100 %	100 %
5.00 ~ 7.00	100 %	100 %	100 %
7.00 ~ 10.00	100 %	100 %	100 %

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TQP-12-01-02(1)

전자문서본은 시험결과에 대한 참고용입니다. 전자문서본(Electronic Copy)

KCL 한국건설생활환경시험연구원 Korea Conformity Laboratories

ISO ISO 16890

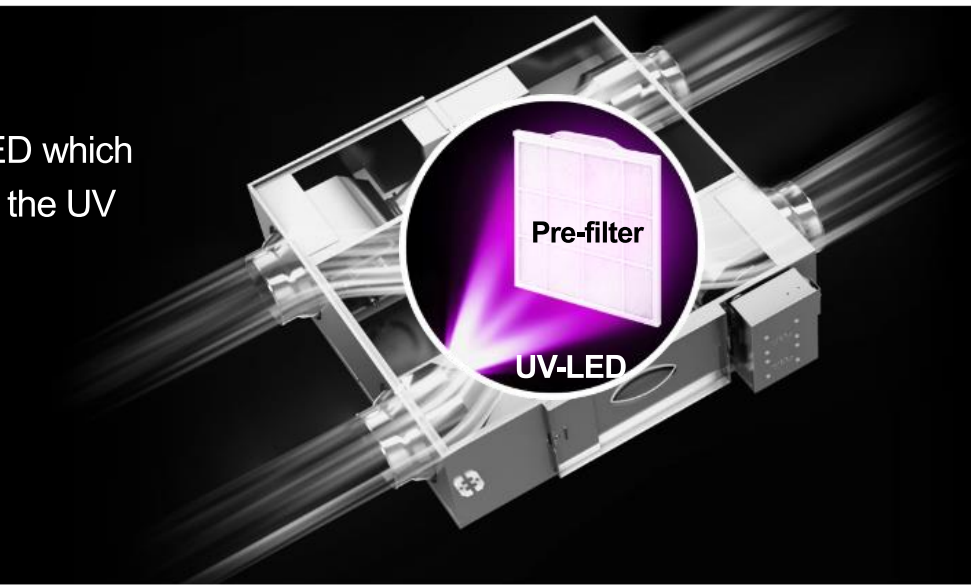
Pre-filter UV Sterilization

By applying UVnano technology, the pre-filter, where the outside air comes in first, blocks 99.99% of bacteria and viruses from growing, makes clean air to supply into the room.

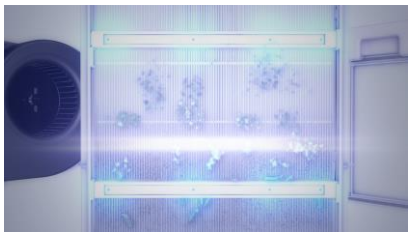
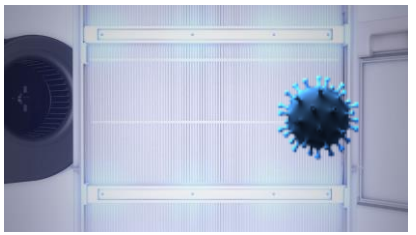
UVnano

UVnano is a compound word of UV (ultraviolet) LED which reduces harmful bacteria, and nanometer which is the UV wavelength unit.

TÜVRheinland




UV nano technology applied

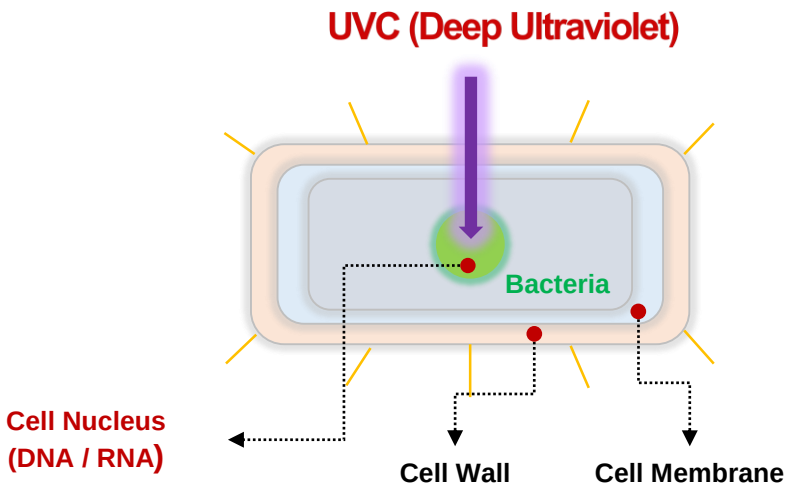
It prevents 99.99% of bacteria and viruses from growing

- The 99.99% sterilization effect of UV LED is the result of testing by TUV Rheinland, an internationally accredited testing institute.
- UVnano sterilization is limited to the surface exposed to UV LED light, and it can be different depending on the actual use environment or product life.

* UVnano is an integrated marketing name that applies LG Electronics' entire home appliances, ie Refrigerator, Washing Machine, Air Conditioners .

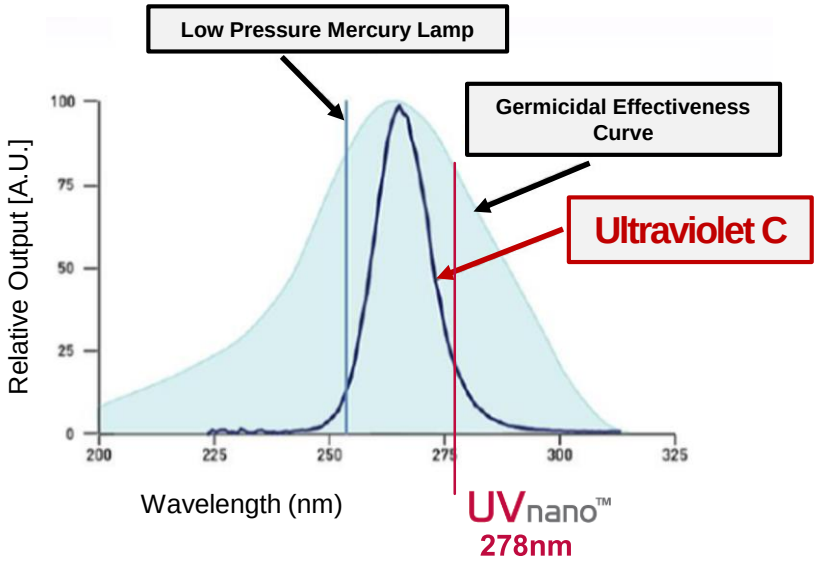
The Effect of UVC Sterilization on ‘Bacteria’

UVC sterilization is the most powerful method to destroy bacterial DNA and RNA.



- 1st step. UVC irradiation
- 2nd step. Change the structure of DNA and RNA inside the cell nucleus
- 3rd step. Stop the cell division function to prevent proliferation (Inactivation)

UVC disinfection is achieved by inactivating DNA and RNA



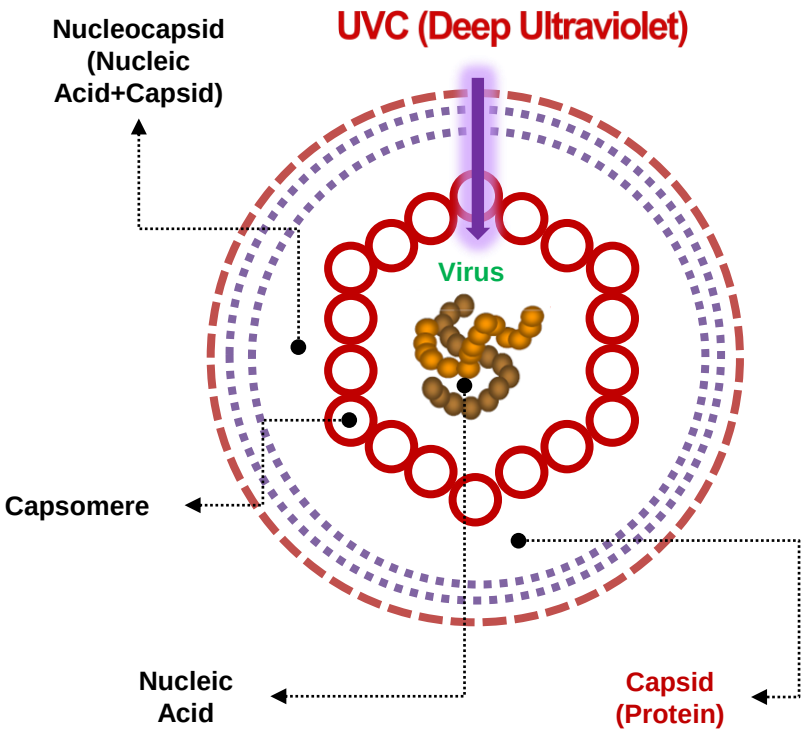
- Ultraviolet Germicidal Irradiation is electromagnetic radiation that can destroy the ability of microorganisms to reproduce by causing photochemical changes in nucleic acids. Wavelengths in the UVC range are especially damaging to cells because they are absorbed by nucleic acids. The germicidal effectiveness of UVC peaks at about 260–265nm.*

Name	Abbreviation	Wavelength (nm)	Notes
Ultraviolet C	UVC	100~280	Short-Wave, Germicidal Completely absorbed by the ozone layer and atmosphere, Hard UV
Ultraviolet B	UVB	280~315	Medium-Wave Mostly absorbed by the ozone layer and atmosphere, Intermediate UV
Ultraviolet A	UVA	315~400	Long-Wave Not absorbed by the ozone layer and atmosphere, Soft UV

*[Source] <The Ultraviolet Germicidal Irradiation Handbook>, 2010, Wladyslaw J. Kowalski

The Effect of UVC Sterilization on ‘Viruses’

In process of sterilizing bacteria through UVnano, viruses parasitized on bacteria can be simultaneously dissipated



- 1st Step. UVC irradiation
- 2nd Step. Destroy the outer protein coating of virus

- Currently, there is limited published data about the wavelength and duration of UVC irradiation required to inactivate viruses.
- In addition to understanding whether UVC irradiation is effective at inactivating a particular virus, there are also limitations to how effective UVC irradiation can be at inactivating viruses generally.**

**[Source] https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/uv-lights-and-lamps-ultraviolet-c-radiation-disinfection-and-coronavirus

UVnano Test Against Bacteria

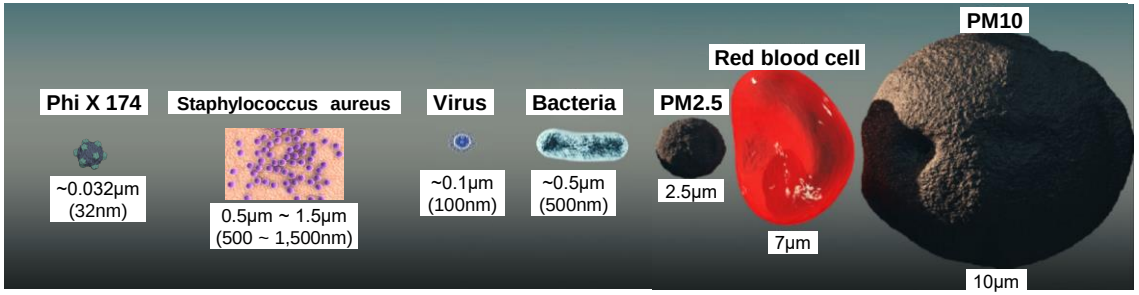
99.99% sterilization capability against bacteria in accordance with TUV Rheinland Standard.

Test Summary

- The built-in UV LED module of tested model (Z-H0150B2SR) has over 99.99% sterilization performance on average to bacteria at measuring points of the Pre-Filter under the proposed test condition.
- Test environment: 25±2℃, 50±10% RH; Measurement after 2 hours of product operation;

Sterilization Efficiency Rate		
Staphylococcus aureus	Staphylococcus epidermidis	Klebsiella pneumoniae
> 99.99%	> 99.99%	> 99.99%

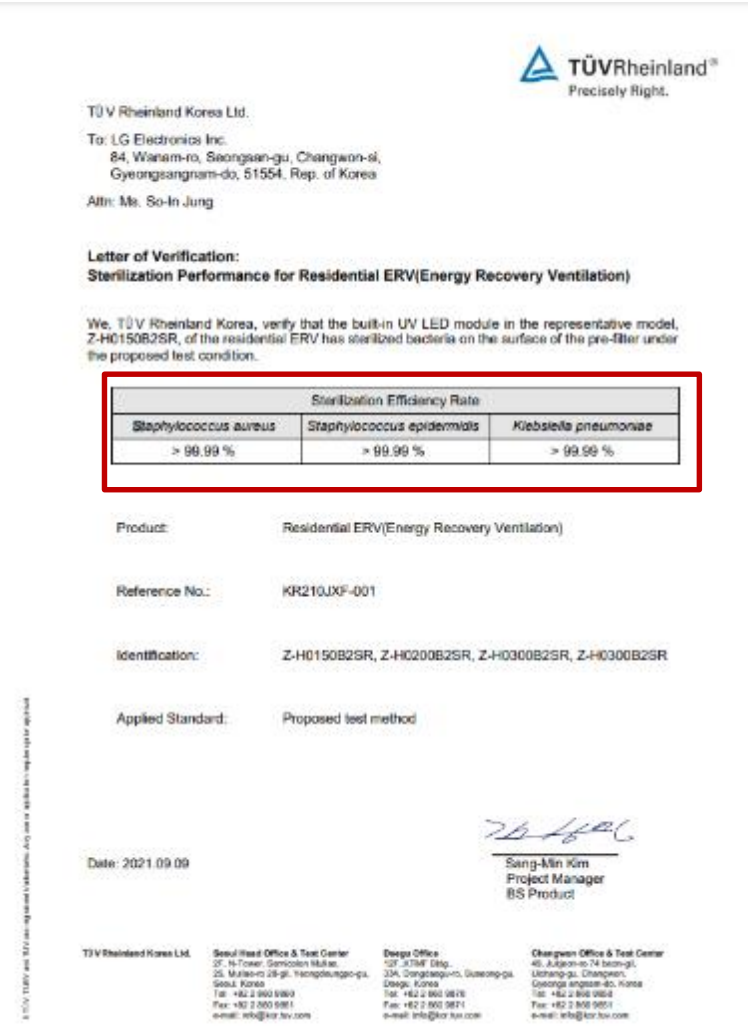
Size comparison of various particles



* The resulting values are the measured values at 5 points set in the experiment.
* This result may be different at practical use conditions of air conditioning system.

Certified Test Report

Tested by TUV Rheinland Standard



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Precisely Right.

TÜV Rheinland Korea Ltd.

To: LG Electronics Inc.
84, Wanam-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, 51554, Rep. of Korea

Attn: Ms. So-In Jung

Letter of Verification:
Sterilization Performance for Residential ERV(Energy Recovery Ventilation)

We, TÜV Rheinland Korea, verify that the built-in UV LED module in the representative model, Z-H0150B2SR, of the residential ERV has sterilized bacteria on the surface of the pre-filter under the proposed test condition.

Sterilization Efficiency Rate		
Staphylococcus aureus	*Staphylococcus epidermidis*	*Klebsiella pneumoniae*
> 99.99 %	> 99.99 %	> 99.99 %

Product:	Residential ERV(Energy Recovery Ventilation)
Reference No.:	KR21GJXF-001
Identification:	Z-H0150B2SR, Z-H0200B2SR, Z-H0300B2SR, Z-H0300B2SR
Applied Standard:	Proposed test method

Date: 2021.09.09

Sang-Min Kim
Project Manager
BS Product

TÜV Rheinland Korea Ltd. | Seoul Head Office & Test Center | Daegu Office | Changwon Office & Test Center

UVnano Test Against Virus

99.99% sterilization capability against virus parasitized on bacteria in accordance with TUV Rheinland Standard.

Test Summary

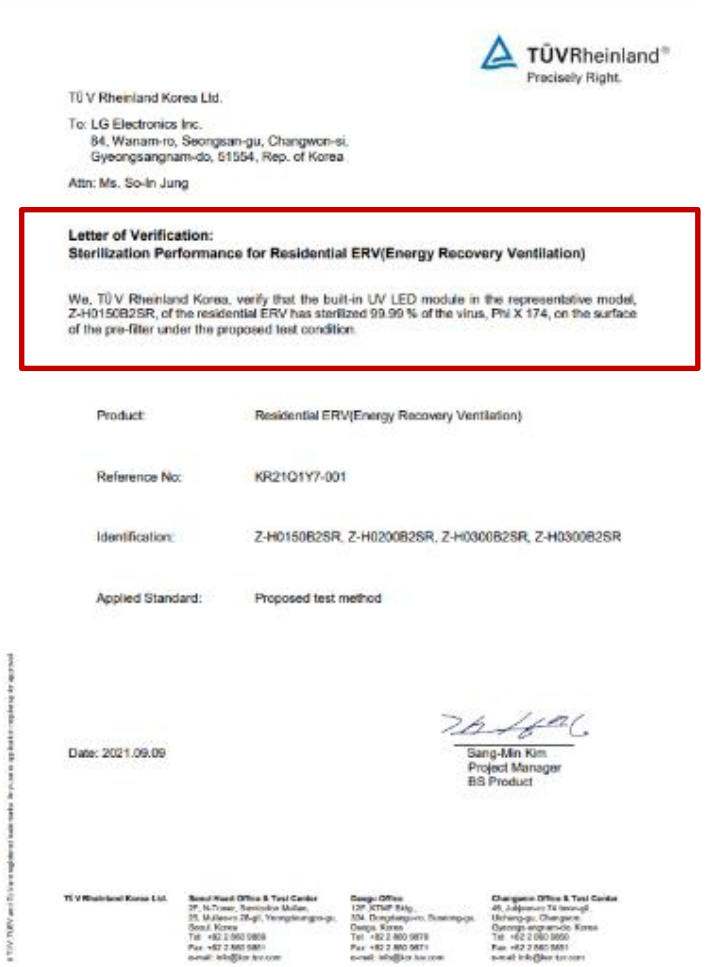
- The built-in UV LED module of the tested model (Z-H0150B2SR) has over 99.99% sterilization effect on the virus (Phi X 174) at measuring points of the Pre-Filter under the proposed test condition.
- Test environment: 25±2℃, 50±10% RH; Measurement taken before and after 2 hours of product operation;

Sampling Point	Test Run	Control Group (PFU/cover glass)	Test Group (PFU/cover glass)	Sterilization Efficiency Rate (%)	
				Individual	Average
①	1st	4.20 x 10^8	1.00 x 10^2	99.99	99.99
	2nd	6.17 x 10^8	4.80 x 10^1	99.99	
	3rd	6.23 x 10^8	6.67 x 10^1	99.99	
②	1st	4.20 x 10^8	8.00 x 10^1	99.99	99.99
	2nd	6.17 x 10^8	5.06 x 10^1	99.99	
	3rd	6.23 x 10^8	1.00 x 10^1	99.99	
③	1st	4.20 x 10^8	9.00 x 10^3	99.99	99.99
	2nd	6.17 x 10^8	7.93 x 10^3	99.99	
	3rd	6.23 x 10^8	6.87 x 10^3	99.99	
④	1st	4.20 x 10^8	2.00 x 10^1	99.99	99.99
	2nd	6.17 x 10^8	5.20 x 10^1	99.99	
	3rd	6.23 x 10^8	1.08 x 10^1	99.99	
⑤	1st	4.20 x 10^8	2.00 x 10^1	99.99	99.99
	2nd	6.17 x 10^8	3.67 x 10^1	99.99	
	3rd	6.23 x 10^8	1.73 x 10^1	99.99	

* The resulting values are the measured values at 5 points set in the experiment
* This result may be different at practical use conditions of air conditioning system.

Certified Test Report

Tested by TUV Rheinland Standard



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TÜV Rheinland Korea Ltd.

To: LG Electronics Inc.
84, Wanam-ro, Seongsan-gu, Changwon-si,
Gyeongsangnam-do, 51554, Rep. of Korea

Attn: Ms. So-In Jung

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Sterilization Performance for Residential ERV(Energy Recovery Ventilation)

We, TÜV Rheinland Korea, verify that the built-in UV LED module in the representative model, Z-H0150B2SR, of the residential ERV has sterilized 99.99 % of the virus, Phi X 174, on the surface of the pre-filter under the proposed test condition.

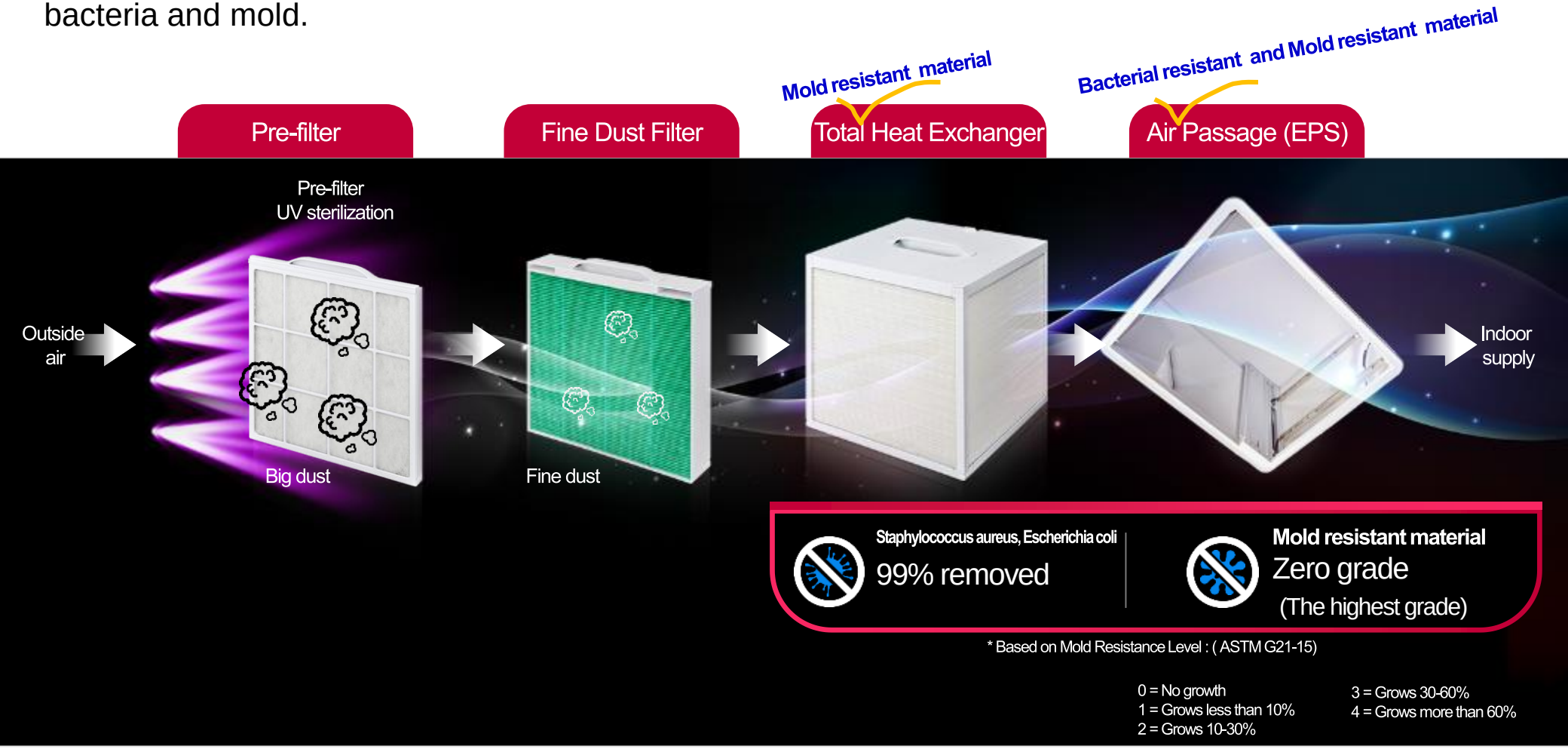
Product:	Residential ERV(Energy Recovery Ventilation)
Reference No:	KR21Q1Y7-001
Identification:	Z-H0150B2SR, Z-H0200B2SR, Z-H0300B2SR, Z-H0300B2SR
Applied Standard:	Proposed test method

Date: 2021.09.09

Sang-Min Kim
Project Manager
BS Product

Bacterial resistant and Mold resistant Air Passage

In addition to UV sterilization of the pre-filter, the total heat exchanger and air passage(EPS) through which air passes are made of Bacterial resistant and Mold resistant material to suppress the growth of bacteria and mold.



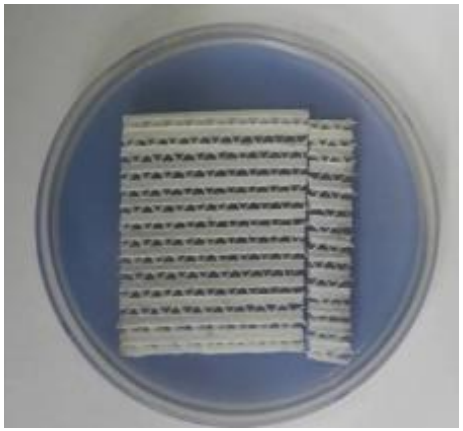
* The results are based on laboratory measurements
* This result may be different at practical use conditions of air conditioning system.

Total Heat Exchange Element Mold Resistance Test

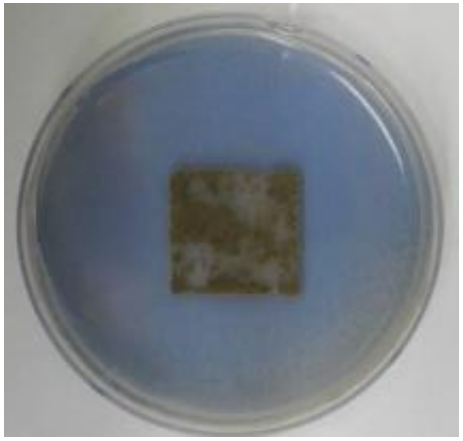
The mold resistance performance of the total heat exchange element is certified as 0 grade.

Test Summary

- Test date and time ’20. 8.
- Testing Institution: Fiti Testing & Research Institute
- Test Specification: ASTM G21-15
- Test strains: Aspergillus brasliensis, Chaetomium globosum, Penicillium funiculosum, Trichoderma virens, Aureobasidium pulluants
- Culture conditions: 28-30℃, 85%RH or higher, 28 days
- Test Result: No growth (Zero grade)



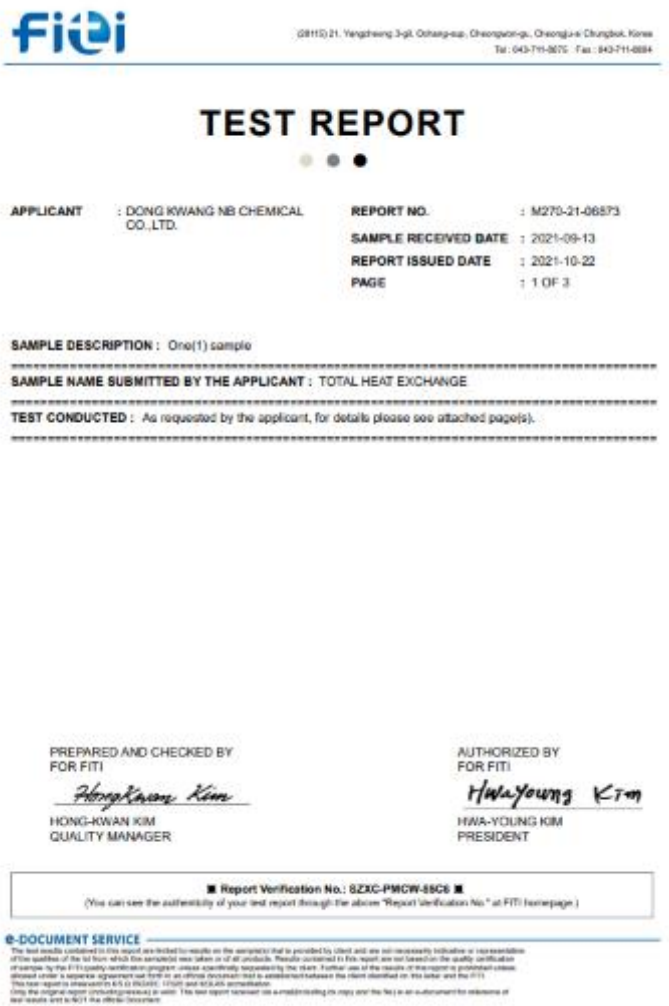
Test Sample



Comparison : Mold grown

- Remark : Rate
  0 = No growth
  1 = Grows less than 10%
  2 = Grows 10-30%
  3 = Grows 30-60%
  4 = Grows more than 60%

Certified Test Report



FITI

TEST REPORT

APPLICANT : DONG KWANG NB CHEMICAL CO.,LTD.

REPORT NO. : M270-21-06573
SAMPLE RECEIVED DATE : 2021-09-13
REPORT ISSUED DATE : 2021-10-22
PAGE : 1 OF 3

SAMPLE DESCRIPTION : One(1) sample

SAMPLE NAME SUBMITTED BY THE APPLICANT : TOTAL HEAT EXCHANGE

TEST CONDUCTED : As requested by the applicant, for details please see attached page(s).

PREPARED AND CHECKED BY
FOR FITI
HONG-KWAN KIM
QUALITY MANAGER

AUTHORIZED BY
FOR FITI
HWA-YOUNG KIM
PRESIDENT

■ Report Verification No.: 8ZXC-PMCW-8SC6 ■

e-DOCUMENT SERVICE

Air Passageway(EPS) Mold Resistant Test

Air passageway is made of mold resistant material to suppress the growth of bacteria.€

Test Summary

- Test date and time ’20. 8.
- Testing Institution: Biotheca
- Test Specification: ASTM G21-15
- Test strains: Aspergillus niger ATCC 9642, Chaetomium globosum ATCC 6205, Penicillium pinophilum ATCC 11797, Gliocladium virens ATCC 9645, Aureobasidium pulluants ATCC 15233, Cladosporium Cladosporioides IFO 6348
- Culture conditions: 29+/-1 ℃, 85% RH, 4 weeks

- Test Result: No growth (Zero grade)

- Remark : Rate

0 = No growth
1 = Grows less than 10%
2 = Grows 10-30%
3 = Grows 30-60%
4 = Grows more than 60%

* The results are based on laboratory measurements
* This result may be different at practical use conditions of air conditioning system.

Certified Test Report

BIOTECA Co., Ltd.

26, Gwollisa-ro 29beon-gil, Osan-si, Gyeonggi-do, 18121, Korea
TEL : (031) 373 - 1628 FAX : (031) 372 - 1629
http://www.bioteca.co.kr

TEST REPORT

CLIENT : LG Electronics
ADDRESS : 84, Wanam-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Republic of Korea
SAMPLE : H (50 ℃ - AFTER LEACHING 32 HOUR)

REPORT NO. : TR-2007-233(E)
RECEIPT DATE : JUL.22.2020
COMPLETION DATE : AUG.25.2020
PAGE : 1 OF TOTAL

(1) TEST RESULTS : DETERMINATION RESISTANCE OF SYNTHETIC POLYMERIC MATERIAL TO FUNGI (APPLY TO ASTM G-21 2015)

CONTENT \ TEST SAMPLE		H (50 ℃ - AFTER LEACHING 32 HOUR)
RATE	1 WEEK	0
	2 WEEK	0
	3 WEEK	0
	4 WEEK	0

The test result of this test report only limited in the sample and sample name presented by the customer and do not represent the all products of the customer. This test report shall be used only within the purpose of its defined usage and also shall not be used for public relations, advertisement and lawsuit without the BIOTECA's lawful conference.

Air Passageway(EPS) bacterial resistant Test

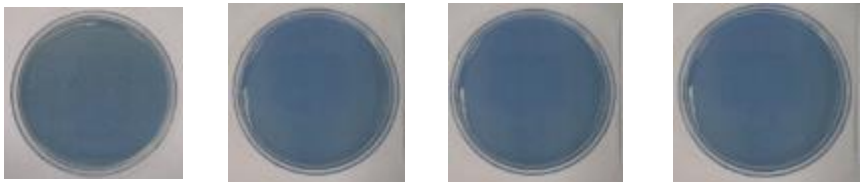
Air passageway is made of bacterial resistant material to suppress the growth of bacteria.

Test Method

- Test date and time ’20. 8.
- Testing Institution: Fiti Testing & Research Institute
- Test Specification: JIS Z 2801: 2010, film adhesion method
- Test strains: Staphylococcus aureus ATCC 6538P, Escherichia coli ATCC 8739
- Test method: Measure the number of bacteria after stationary culture of the test bacterial solution at (35+/-1)℃, 90%RH for 24 hours
- Test Result: Antibacterial activity R 4.6 (Strain 1), R6.2 (Strain 2)

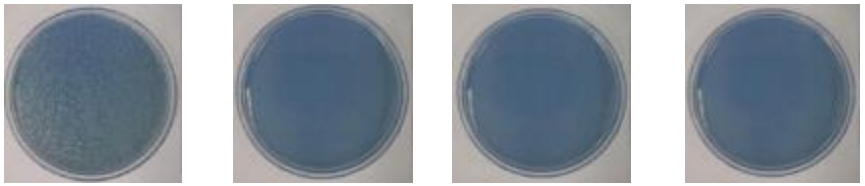
		BLANK	#1	#2	#3
BACTERIA-1:	The number of bacteria after inoculation	1.7×10^4	-	-	-
	The number of bacteria after 24 h	2.6×10^4	< 0.63	< 0.63	< 0.63
	Antibacterial activity	-	4.6	4.6	4.6
BACTERIA-2:	The number of bacteria after inoculation	1.8×10^4	-	-	-
	The number of bacteria after 24 h	1.1×10^6	< 0.63	< 0.63	< 0.63
	Antibacterial activity	-	6.2	6.2	6.2

Test strains : Staphylococcus aureus ATCC 6538P



Blank #1 #2 #3

Test strains : Escherichia coli ATCC 8739



Blank #1 #2 #3

Certified Test Report

fiti

TEST REPORT

APPLICANT : LG Electronics

REPORT NO. : M270-20-12018
SAMPLE RECEIVED DATE : 2020-08-12
REPORT ISSUED DATE : 2020-08-26
PAGE : 1 OF 6

SAMPLE DESCRIPTION : THREE(3) SAMPLES

SAMPLE NAME SUBMITTED BY THE APPLICANT : ANTIMICROBIAL ACTIVITY AND EFFICACY EPS SPECIMEN - #1 (1), #2 (2), #3 (3)

TEST CONDUCTED : As requested by the applicant, for details please see attached page(s).

PREPARED AND CHECKED BY FOR FITI
HONG-KWAN KIM
QUALITY MANAGER

AUTHORIZED BY FOR FITI
JE-GOO JUN
PRESIDENT

■ Report Verification No.: CFDK-UT61-0671 ■

e-DOCUMENT SERVICE

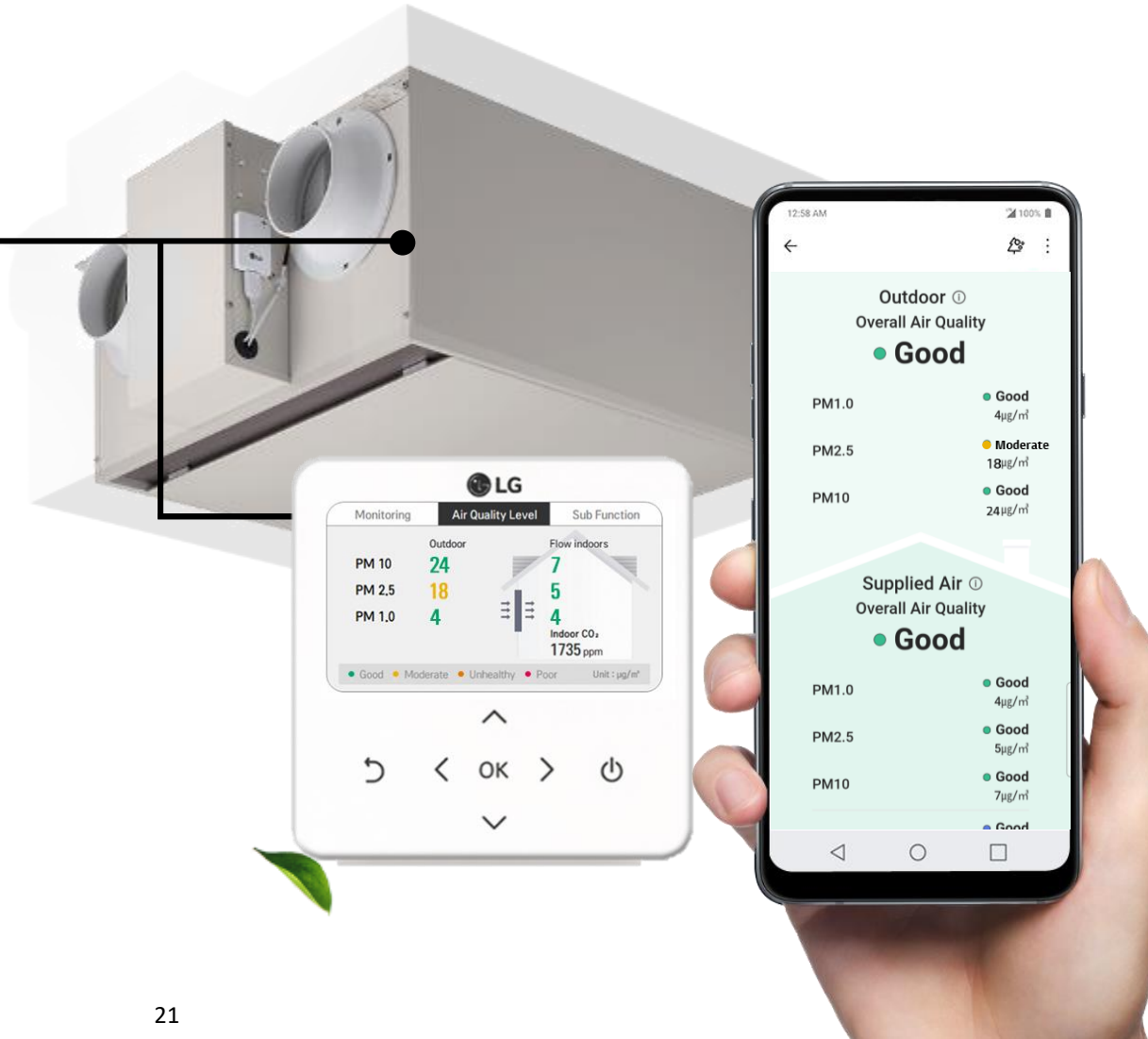
* The results are based on laboratory measurements.

* This result may be different at practical use conditions of air conditioning system.

Dual Fine Dust Monitoring by PM1.0 sensor

Two fine dust sensors monitor the air coming in from the outside and the fine dust in the air supplied to the room after passing through the filter in real time to ensure that clean air is always supplied.

Dual Laser
Fine Dust
PM1.0 Sensor



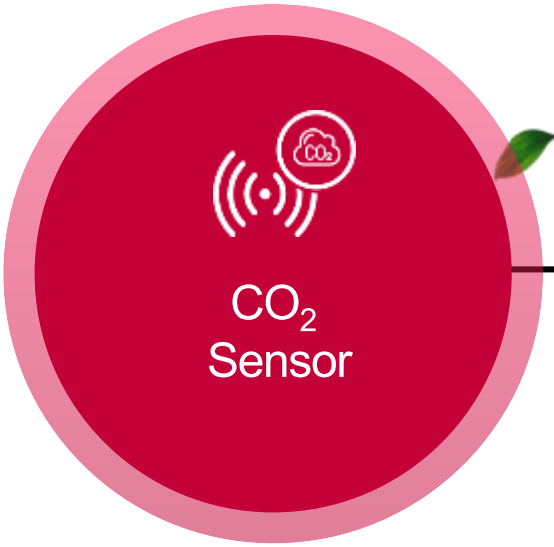
When the concentration of fine dust in the air supplied to the room rises above the setting standard, the filter replacement notification is displayed.

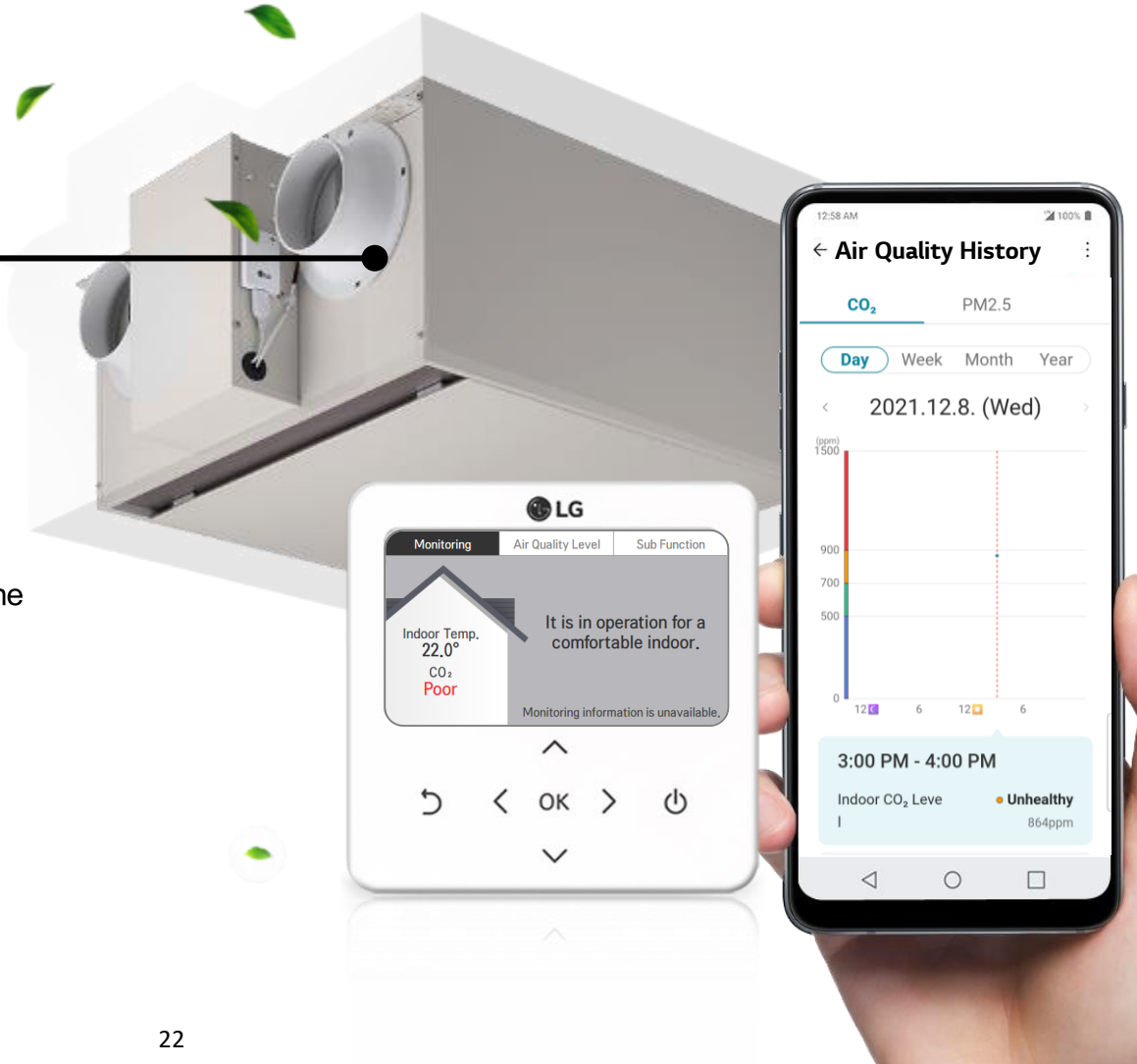
* Wi-Fi module is optional.

* PM1.0 sensor are embedded

Indoor CO_2 Monitoring

The embedded CO_2 sensor where in the room monitors the concentration of carbon dioxide in real time and automatically controls the amount of ventilation.





It monitors CO_2 concentration of the air going out from the room in real time.

The amount of ventilation is increased when the concentration level of carbon dioxide is high, and the amount of ventilation is automatically reduced when it is low.

* Wi-Fi module is optional.

* CO_2 sensor is embedded

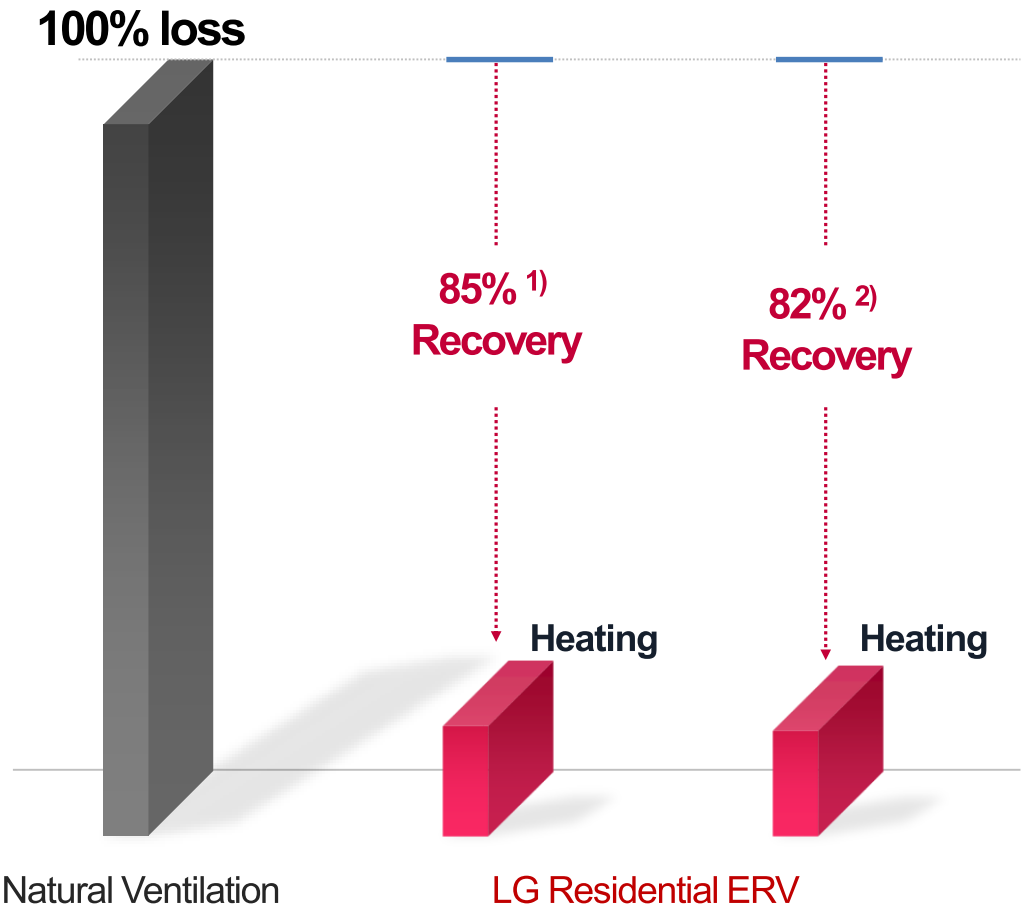
Energy Saving

- Highly Efficient Total Heat Exchanger
- LG ERV Energy Saving Technology
  - Night Time Free Cooling
  - Delay Operation
  - CO_2 Auto Operation (Option)
  - Seasonal Auto Operation

Highly Efficient Total Heat Exchanger

A highly efficient total heat exchanger recovers energy and saves cooling and heating costs.

Especially in summer when the air conditioner is operated, ventilation with LG Residential ERV can significantly reduce electricity bills compared to Natural Ventilation.



Note 1) Temperature Exchange Efficiency is tested at **ErP heating condition.**
* Based on the LZ-H015GBA6 model, Super High mode
※ Simulation conditions Indoor / Outdoor temperature and humidity
• Heating : Indoor Ambient Temp. 20°CDB / 12°CWB, Outdoor Ambient Temp. 7°CDB

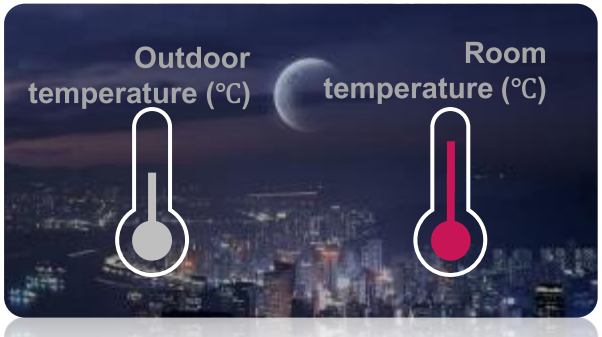
Note 2) Temperature Exchange Efficiency is tested at **ErP heating condition.**
* Based on the LZ-H020GBA6 model, Super High mode
※ Simulation conditions Indoor / Outdoor temperature and humidity
• Heating : Indoor Ambient Temp. 20°CDB / 12°CWB, Outdoor Ambient Temp. 7°CDB

Energy Saving by Connecting Air Conditioner

It detects indoor and outdoor temperatures and switches to the optimal operation mode depending on the environment to save energy and manage indoor air quality.

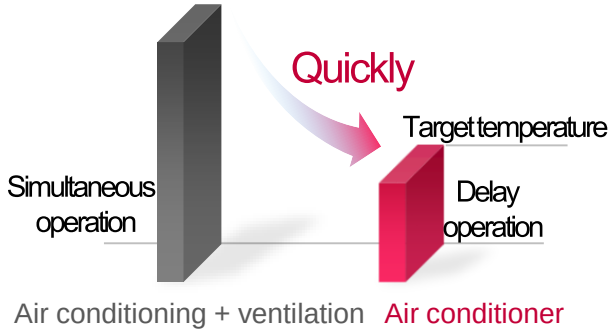
01 Night Cooling Operation

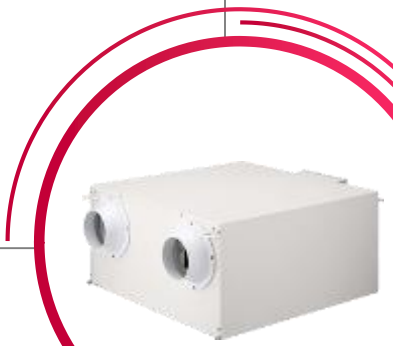
Saving air conditioner usage time by supplying cool outdoor air late at night



02 Ventilation Delay Operation

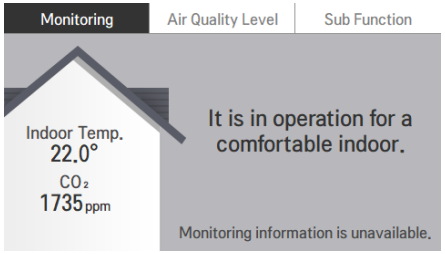
When the air conditioner is turned on, the ventilation operation is automatically delayed for quick cooling.

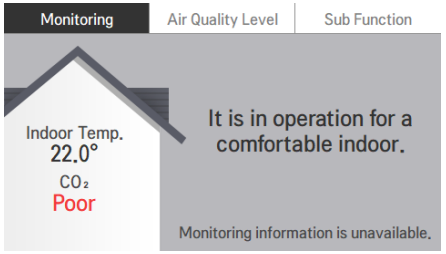




03 CO2 Auto Operation

Minimize energy loss by optimal operation according to the CO_2 level.





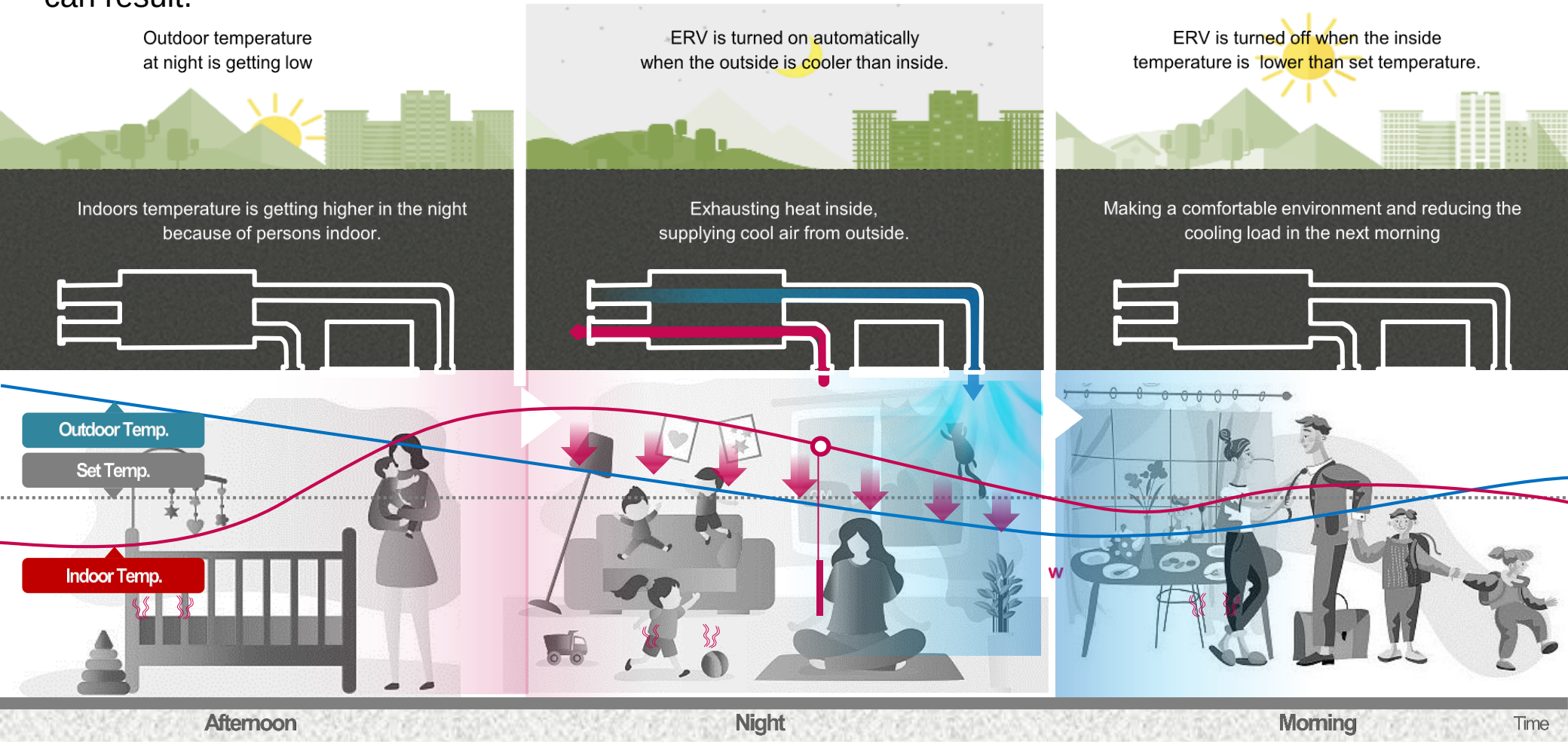
04 Seasonal Operation

Energy saving is achieved by detecting indoor and outdoor temperatures. It automatically switches to the optimal operation mode according to the season.

Heat recovery Normal Automatic

Night Time Free Cooling - Energy Saving Technology(1)

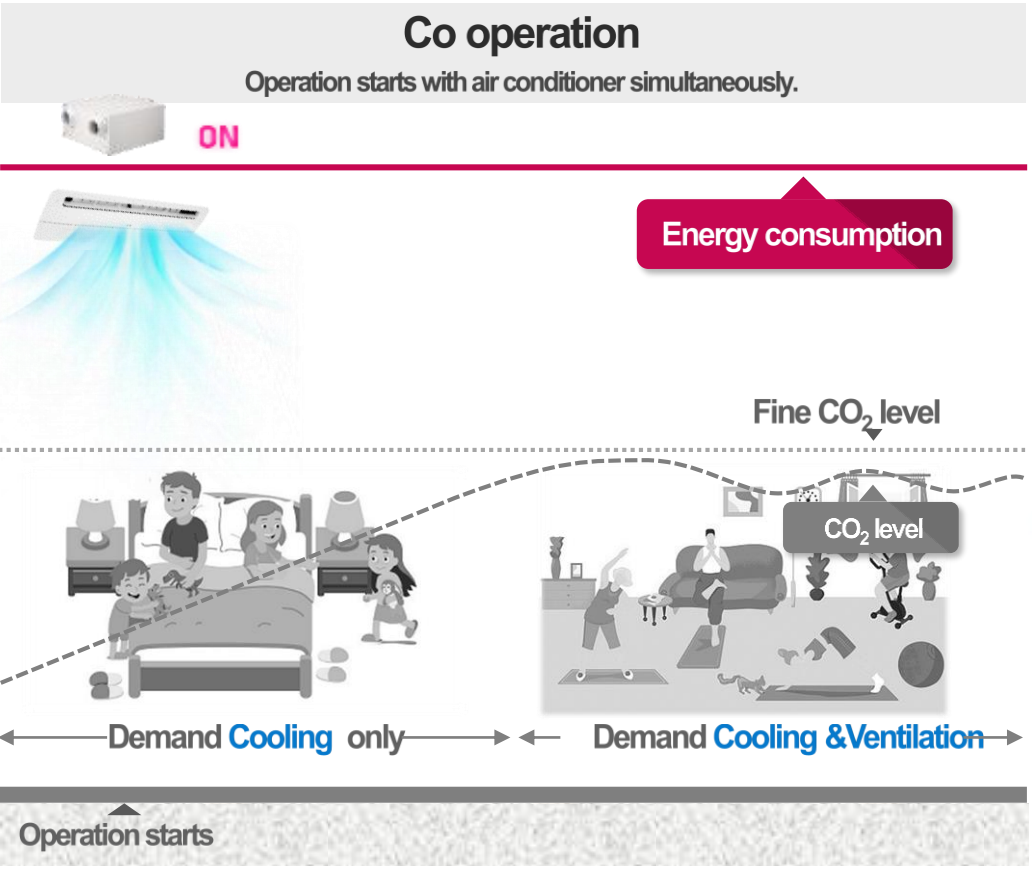
Discharges the indoor heat at night in summer and supplies cool outdoor air indoors. So energy saving can result.

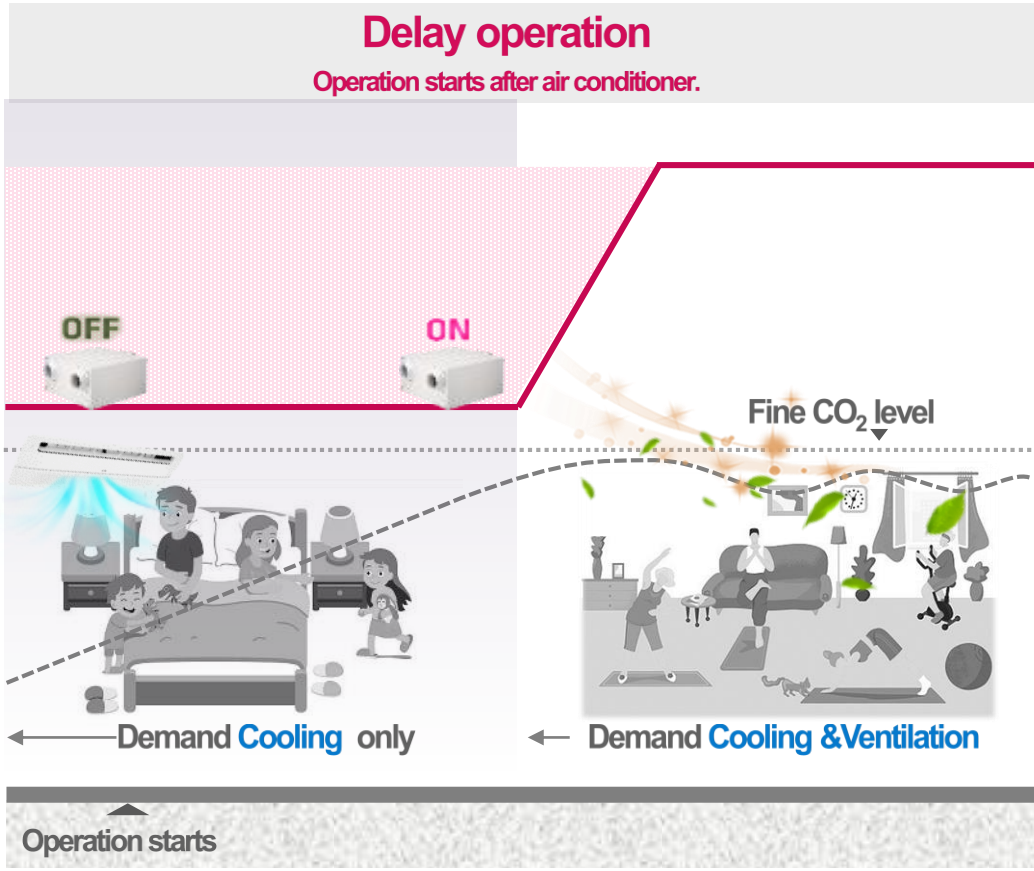


* This function is operated with 'Night Time Free Cooling' on remote controller.
** Energy saving rate can be differed depending on weather condition.

Delay Operation - Energy Saving Technology(2)

When you turn on the air conditioner and ERV At the same time, Delay Operation can reduce unnecessary heating and cooling energy loss by automatically delaying the ERV operation.

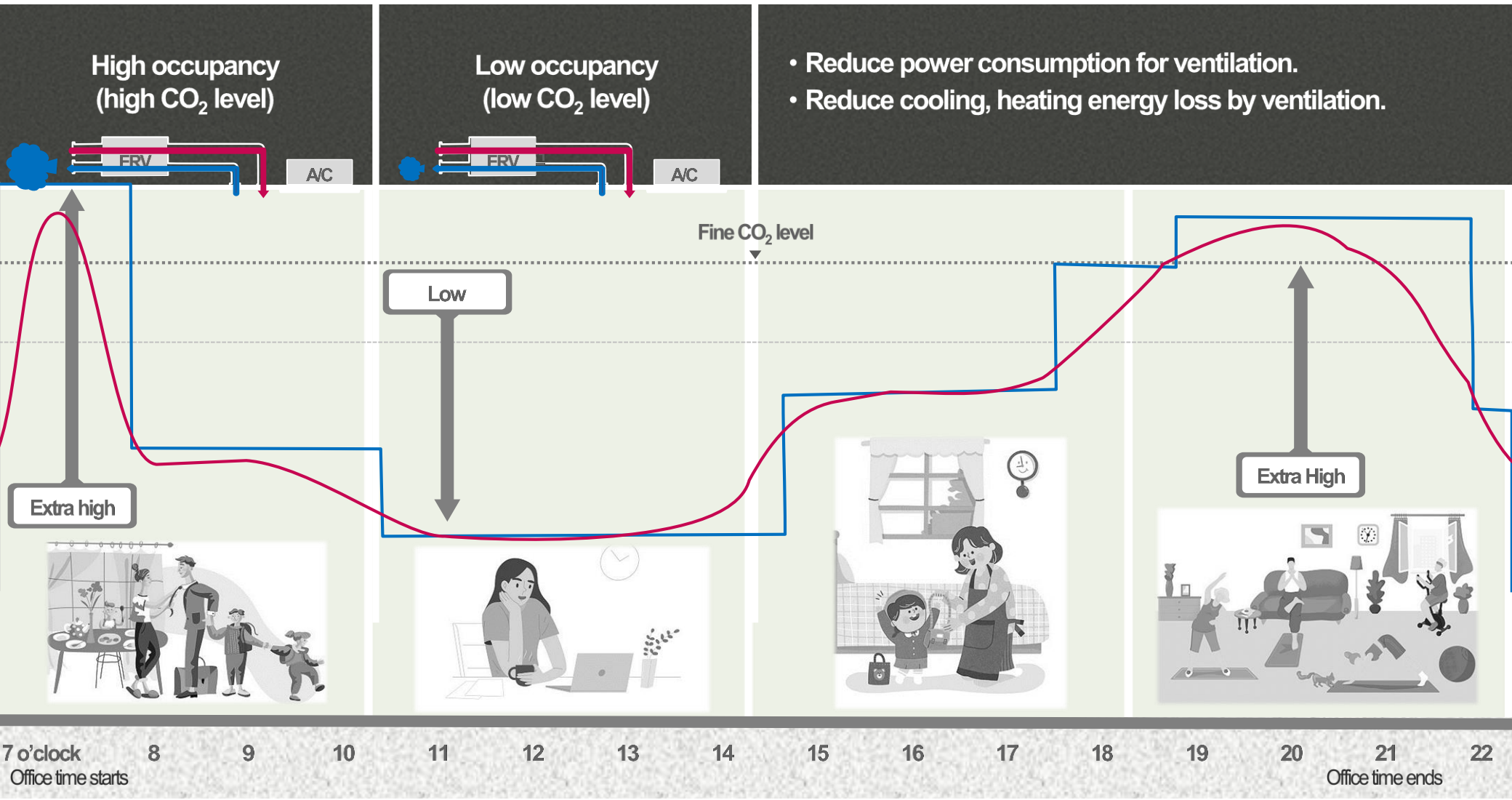




* This function is operated with 'Delay Operation' in remote controller.
(with MULTI V, The delay time can be selected between 1 and 60 minutes.)
** Energy saving rate can be differed depending on weather condition.

CO_2 Auto Operation - Energy Saving Technology(3)

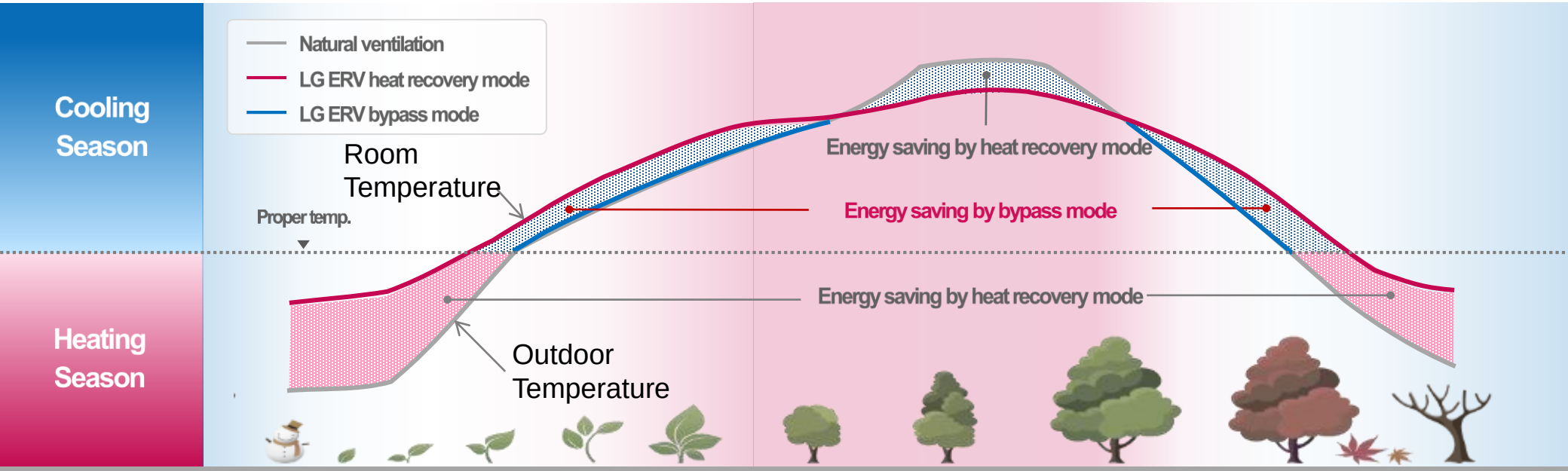
LG ERV reduces energy loss with auto fan speed control following CO_2 level.



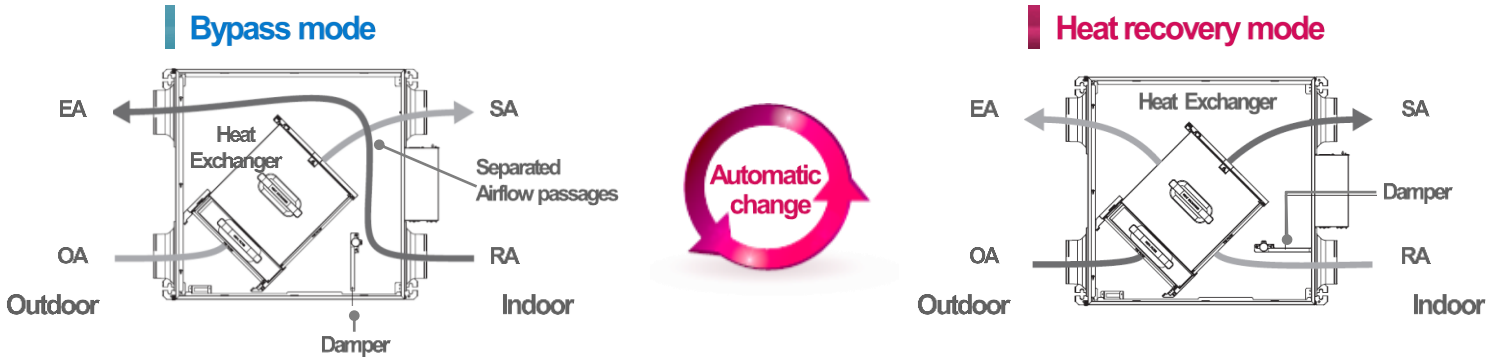
* Energy saving rate can be differed depending on weather condition.

Seasonal Auto Operation - Energy Saving Technology(4)

LG ERV senses outdoor temperature and operates automatically following weather condition.



Seasonal Operation



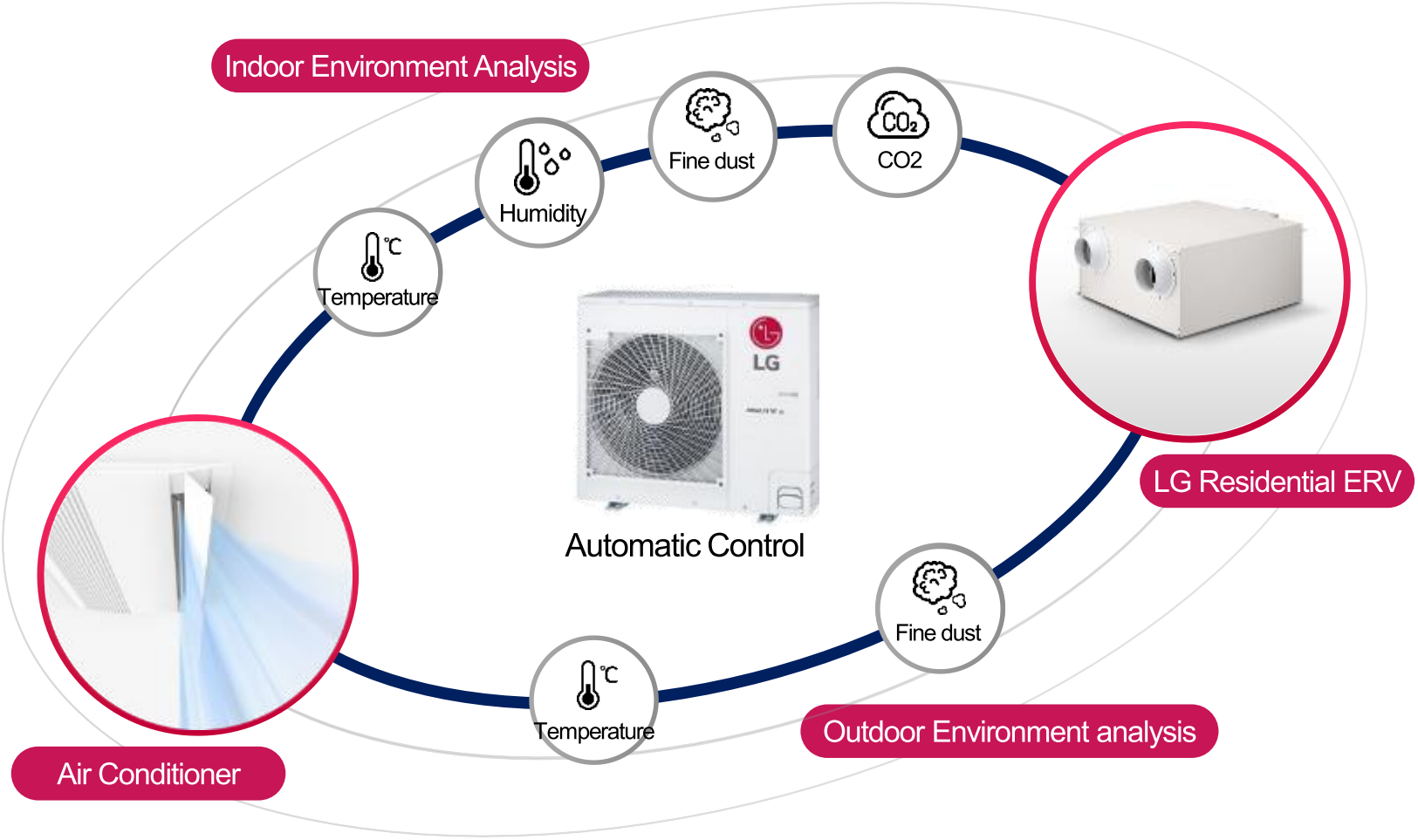
* This function is operated with ‘Auto’ mode in the wired remote control. (By embedded temperature sensor in OA and RA)
** Energy saving rate can be differed depending on weather condition.

Comfort

- NEW Automatic Control by the Environment
- Comfortable Ventilation
- Quick Cleaning with Air Purification
- Low Noise

Automatic Control by the Environment

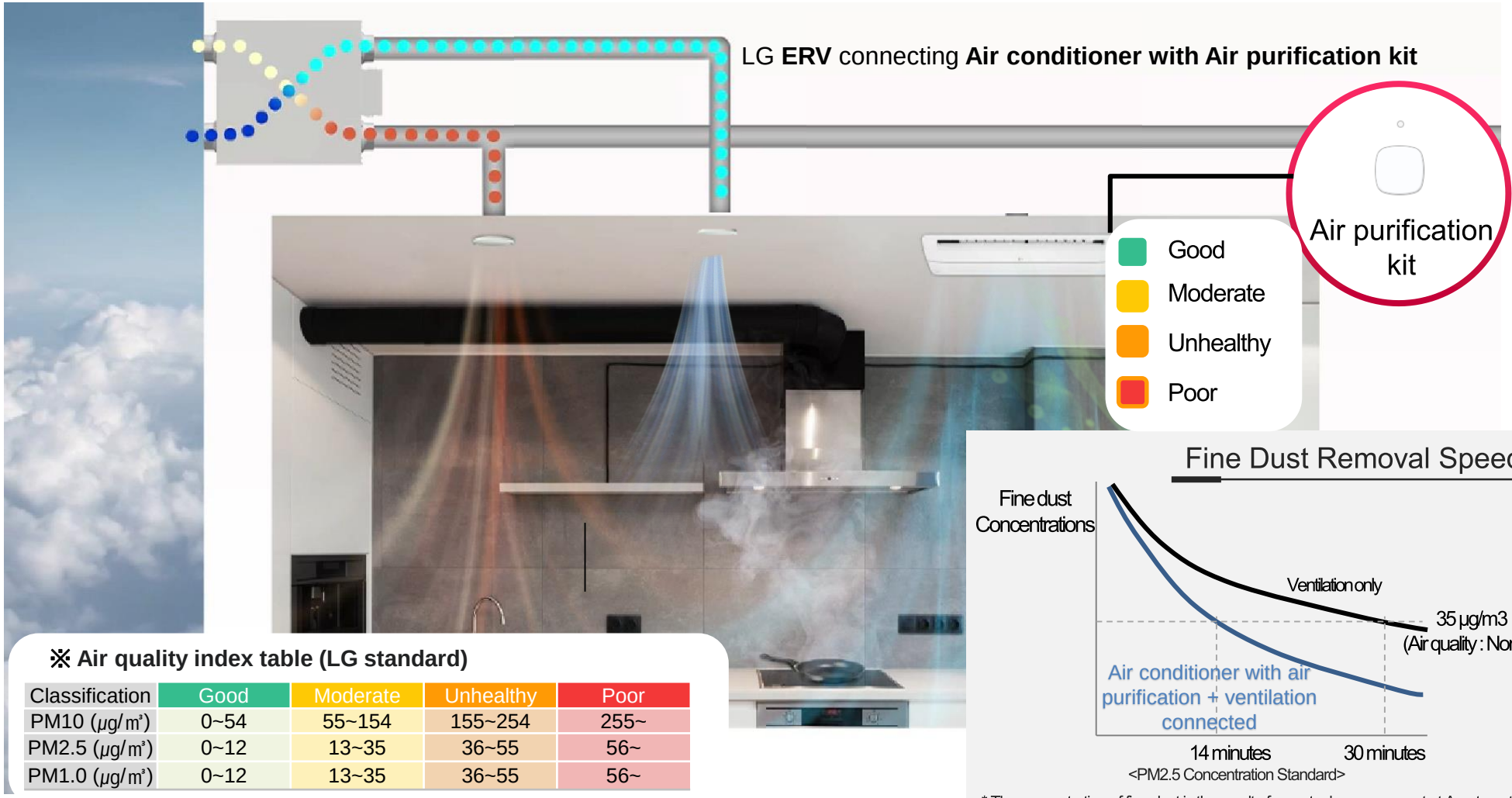
LG ERV automatically controls ventilation by monitoring and analyzing indoor and outdoor air conditions. It finds the optimal operating conditions for the air conditioner and ventilation.



※ This automatic control can be applied when the ventilation system is connected with an air conditioner equipped with the air purification kit.

Automatic Control by the Environment

LG ERV finds the optimal operating conditions for the air conditioning and ventilation, and removes fine dust up to twice as fast. When 1way cassettes senses fine dust is below “Unhealthy”, ERV is automatically operated in super high mode to remove indoor fine dust quickly.



※ Air quality index table (LG standard)

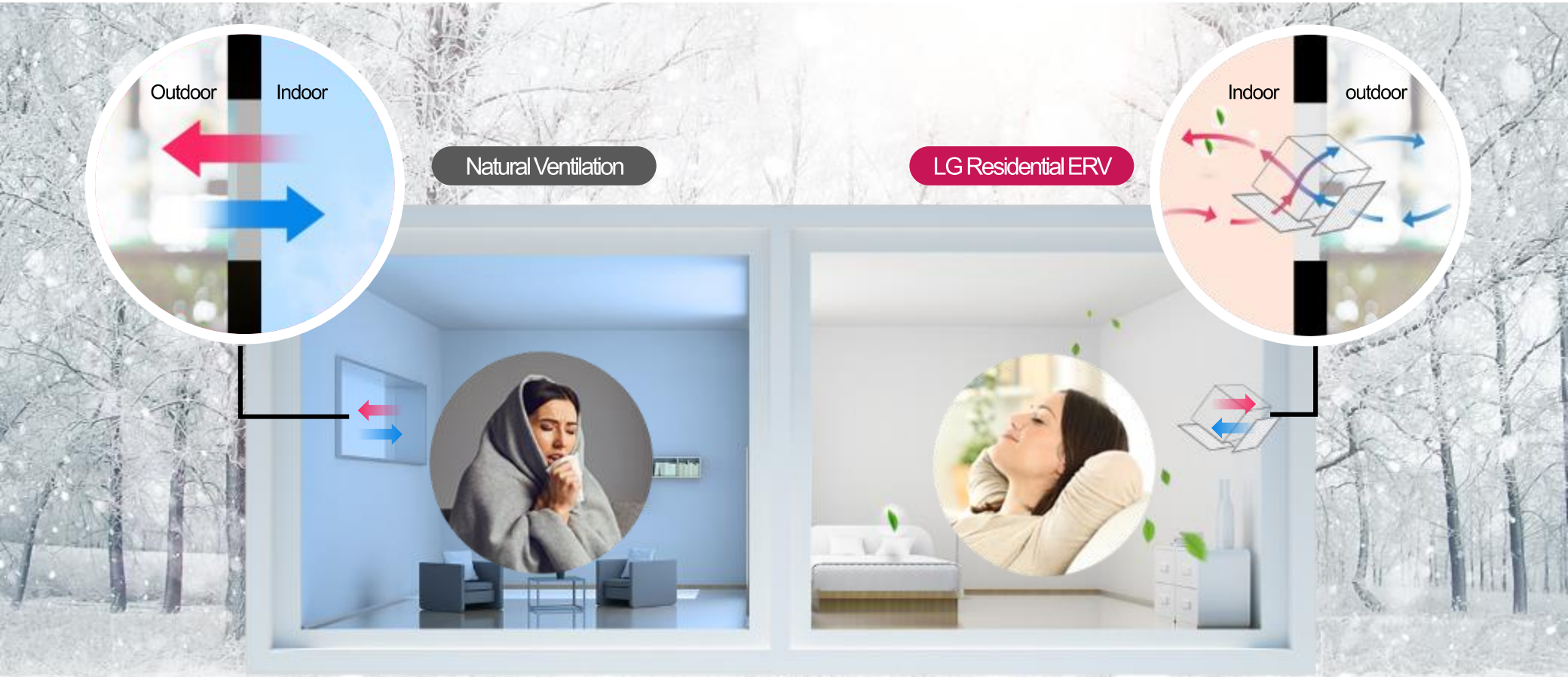
Classification	Good	Moderate	Unhealthy	Poor
PM10 (㎍/㎥)	0~54	55~154	155~254	255~
PM2.5 (㎍/㎥)	0~12	13~35	36~55	56~
PM1.0 (㎍/㎥)	0~12	13~35	36~55	56~

* The concentration of fine dust is the result of an actual measurement at Apartment, Seoul, and may vary depending on the environment.

* The above function is applicable when the ventilation is connected with an air conditioner with the air purification kit.

Comfortable Ventilation

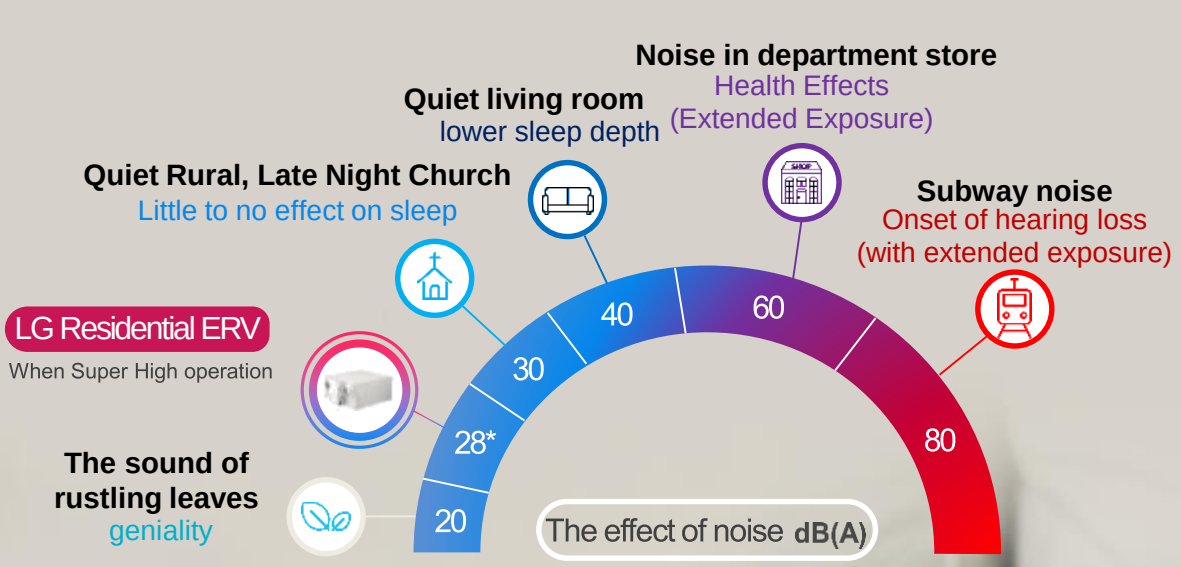
In winter, the highly efficient total heat exchanger* heats the cold air from outdoor to the same temperature as the room through heat exchange with the exhausted indoor air. And in the summer, it cools the warm air from outdoor and supplies it to the room. So you can **ventilate comfortably all year round.**



Note) Total heat exchanger: A device that exchanges heat and moisture. The heat/moisture exchanger in which the cold and hot air flowing on both sides of the membrane, which is made of pulp material, exchange heat with each other.

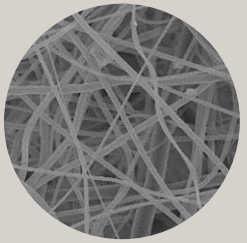
Low Noise

LG provides quiet ventilation to customers by low noise fan, highly efficient motor, low air resistance filter and so on.



Low noise fan

High efficient motor



Low air resistance filter

* Based on the LZ-H015GBA6 model, Super High mode, Sound Pressure Level
* Sound Power Level : 53dB at the same condition
* This is LG Internal test results so results may vary in actual use conditions.

Convenience

- NEW Smart Controls
- Filter Maintenance Alarm
- Easy Filter Maintenance
- Convenient Design Program

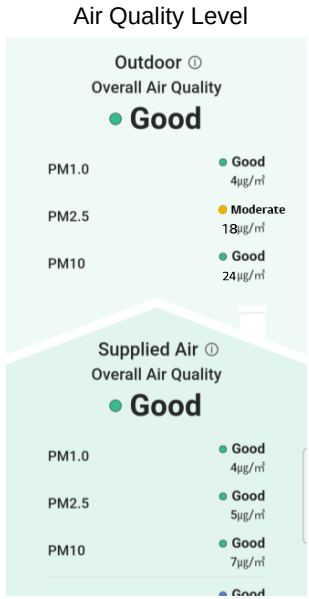
Smart Controls

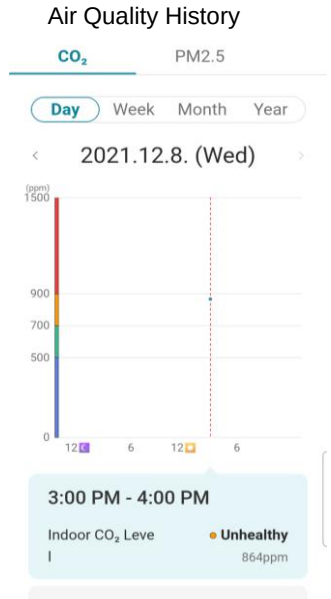
It is possible to check and control the air condition conveniently anytime, anywhere with Wi-Fi as well as wired remote control and 3rd party wall pad.

Wired Remote Control

Indoor CO_2
Outdoor fine dust
Indoor supply air fine dust

Mobile





Check and control the air condition
anytime, anywhere

Third-party Wall Pad

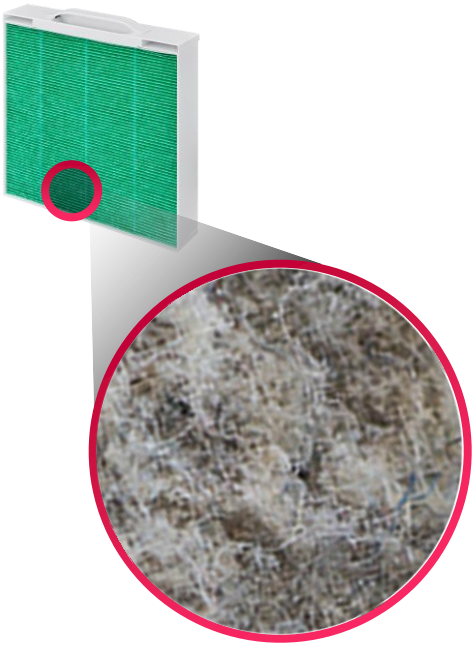
Total indoor condition
Concentration level of find dust

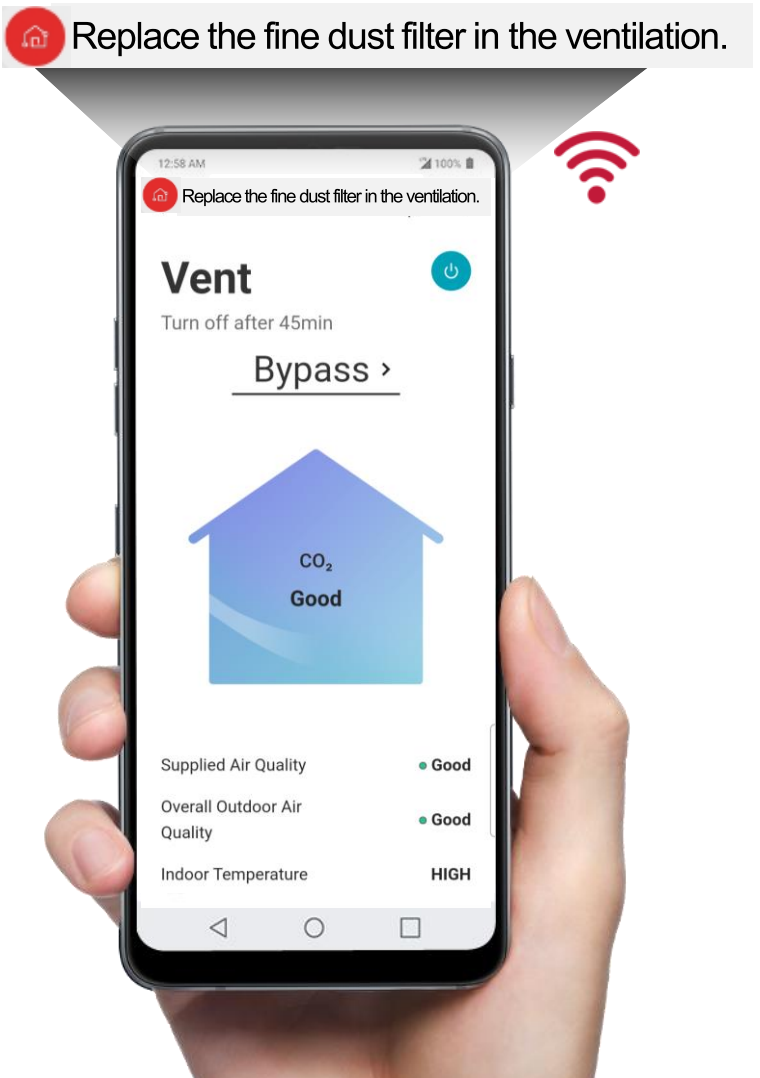
* Wi-Fi module is optional
* To use 3rd party wall pad, please contact HQ Engineering solution or SE team.

Filter Maintenance Alarm

Two laser sensors located front and back of the fine dust filter measure the concentration of fine dust in the air supplied to the room. If it is higher than the set standard, it is judged that the life of the filter is over, and a filter replacement notification and text message are sent.

When the filter should be replaced?

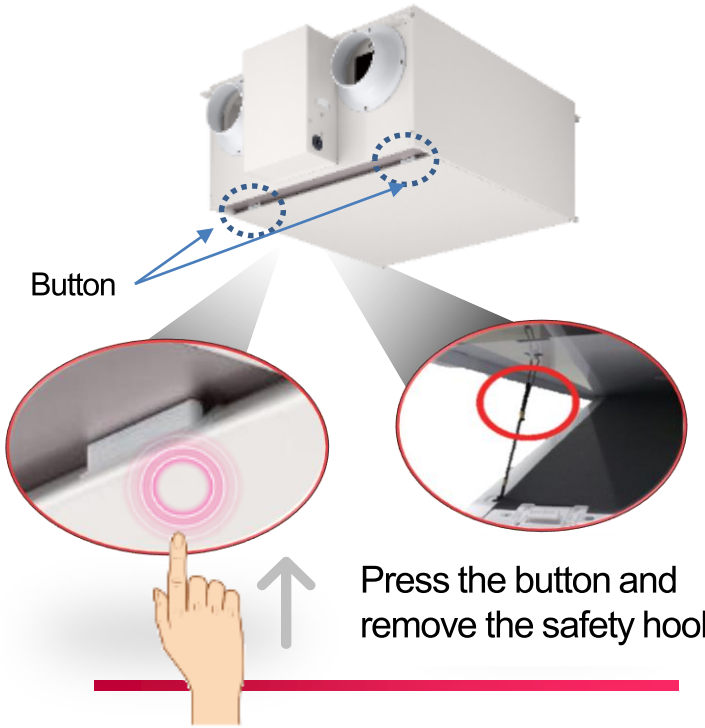




Easy Filter Maintenance

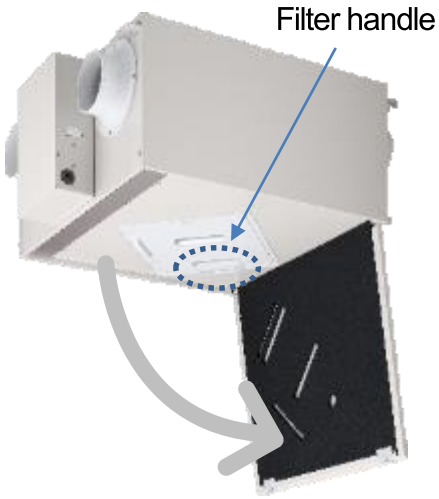
The cover can be opened by pressing the one-touch buttons located on both sides without a separate tool, and the filter comes out easily by holding the filter handle and pulling it down.

01



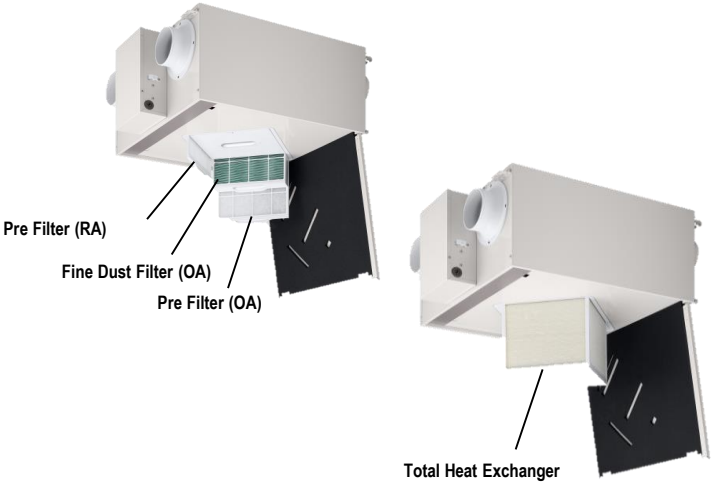
Press the button and remove the safety hook

02



After removing the fall prevention wire, pull down the cover to open it.

03



Loose a screw, hold the filter or total heat exchanger handle and pull it out down.

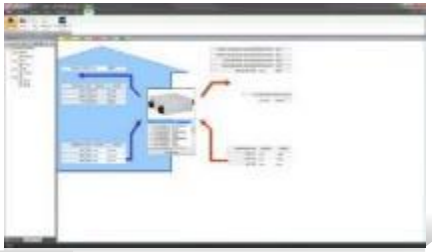
* Depending on the filter, there may be a big difference in performance, such as dust collection performance and noise. Therefore it is recommended to use a genuine filter approved by LG Electronics.

Convenient Design Program

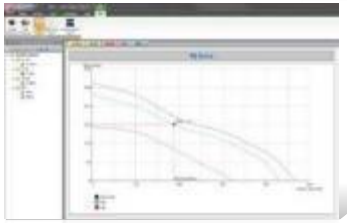
LG provides special program for ERV design, named LATS for consultants.
Quick, appropriate design is possible with this program.

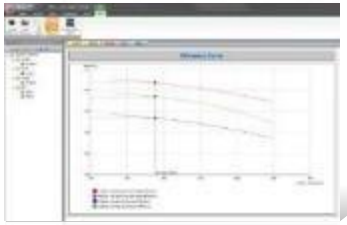
LATS HVAC

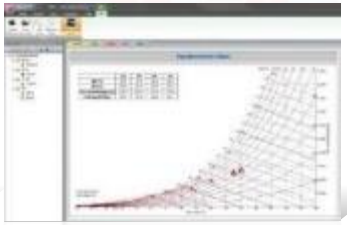
- This is a model selection program for quick and appropriate design for consultants.



1. Select ventilation.







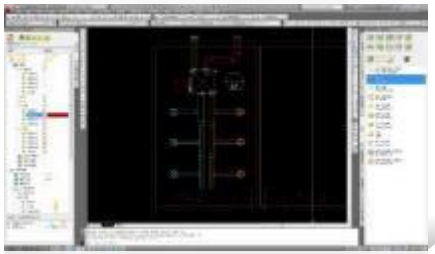
2. Quotation and test reports are issued automatically.
(Efficiency Curve, Heat Recovery, PQ Curve, Chart)

LATS CAD

- This is an easy to use and innovative design software.

1. Select ventilation unit.

2. Product list.



3. Duct design.

4. Quotation and test report.

Product Specifications

(Super High / High / Low) Appendix

			LG Residential Ventilation (Ceiling type)	
			LZ-H015GBA6	**LZ-H020GBA6**
Basic Performance	**Capacity**	CMH	150	200
	Power Supply	Ø, V, Hz	1, 220, 50	1, 220, 50
	External Static Pressure	Pa	100 / 70 / 50	
	Air Flow	CMH	150 / 150 / 80	200 / 200 / 100
	Dimension W x H x D)	mm	640 x 320 x 640	
	Net Weight	Kg	23	
ERV mode (Total Heat Recovery Ventilation mode)	**Current**	A	0.43 / 0.38 / 0.23	0.59 / 0.51 / 0.26
	Power Input	W	56 / 49 / 26	79 / 71 / 30
	Sound Power Level	dB(A)	53 / 51 / 45	55 / 53 / 46
	Sound Pressure Level	dB(A)	28 / 26 / 21	30 / 28 / 22
	Temperature Exchange Efficiency(Heating)(ErP)	%	85	82
	Enthalpy Exchange Efficiency(Heating/JIS)	%	79 / 79 / 83	75 / 75 / 81
	Enthalpy Exchange Efficiency(Cooling/JIS)	%	74 / 74 / 80	68 / 68 / 76
Bypass mode	**Current**	A	0.45 / 0.40 / 0.26	0.60 / 0.52 / 0.29
	Power Input	W	63 / 53 / 31	84 / 73 / 35
Filters	**Fine Dust Filter**	-	ePM1 95% filter (over F8 grade of EN779 standard)	
Hygiene	**UV LED**	-	Sterilization efficiency 99.99% pre-filter sterilization	
	Total Heat Exchanger (Electric heat element)	-	Anti-mold grade 0	
Air Quality Display	**Fine Dust PM1.0 Sensor**	-	Default (Indoor/Outdoor)	
	CO2	-	Default	
	Temp. Sensor	-	Default (Indoor / Outdoor)	
Add-ons	**Wi-Fi**	**-**	Optional	
	System	**-**	Rapid air cleaning that can be linked with the air purification function of the system air conditioner	