

# AIR+PLUS

Air Conditioning Technologies



AP-MESF Kitchen Hood  
Extractor Units

59



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**Plug & Play**

# AP-MESF Kitchen Hood Extractor Units

Double-walled hoods can be used in the kitchens, cooking areas used in places with large-volume production such as food factories, shopping malls' restaurants and hotels. Airplus hood plants are suitable for double-wall hood applications, and offers ideal air conditioning solutions for kitchen applications with its outdoor unit option. Automation is on the unit's panel.

## ► In the Commercial Kitchen Hood Systems- En 16282

After 14 years of study, the European Union set a standard on the air quality, and from the input of the hood to the point of emitting into the atmosphere in commercial kitchens. This standard determines the efficiency of environment, functionality, safety, and energy. EN 16282 standard, which is connected to the Ecodesign directive, which came into force as of 1 January, 2018, determines following requirements:

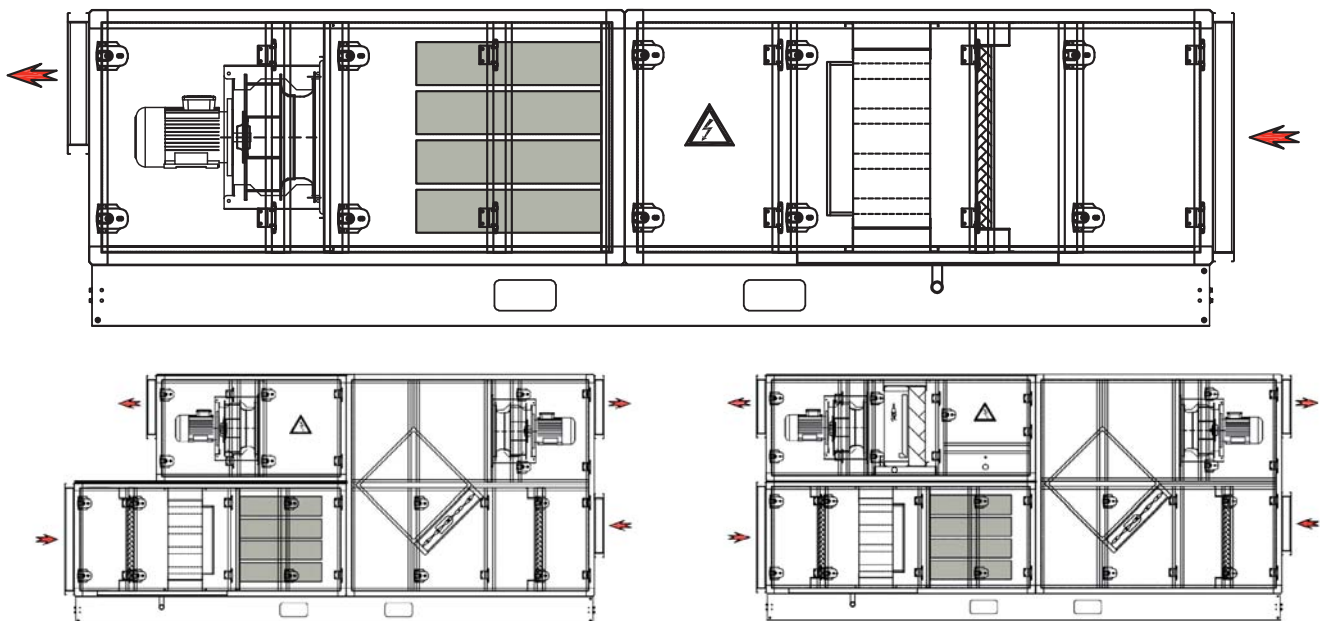
- 1 – Determining the General Requirements.
- 2 – Determining the Kitchen Ventilation Hood – Single or Double Wall
- 3 – Determining the Kitchen Ductworks – Exhaust and Fresh Air Channels.
- 4 – The Exhaust Air Channel: Preventing Fire, Oil Collection, and Soot Accumulation.
- 5 – Conditioning Kitchen Fresh Air, and Designing the Heat .Recovery
- 6 – Determining the Unit, which provides Kitchen with Exhaust and Fresh Air; EN 16282 Standard has conditions, which determine Human Security, Fire and Air Quality.
- 7 – The Ozone Generator should be used to prevent anointment and soot accumulation in the exhaust air channel, and designed materials should be resistant to 60 °C.
- 8 – There should be a filtering (Electrostatic) system having an efficiency of at least 94% before the exit to the atmosphere of the exhaust line.
- 9 – In case an ozone generator is used in the exhaust air channel, an "Ozone Application" or "Ozone" label should be put at every 10 meters on the air channel.
- 10– In case the ozone generator is used in the exhaust duct, some automation measures need to be taken in the exhaust fan system. With the fire-resistant air damper having thermic element at the hood output and the sensors facing the stream of air and observing the pressure in the air channel, the ozone generator needs to activate after the pressure in the channel increases over 20 Pa, and when the system is turning off, first the ozone generator and then the exhaust fan need to turn off.
- 11– If the outlet of the exhaust fan to the atmosphere is at the ground level, it should be monitored with the ozone sensor, and the ozone concentration should be checked in the same ratio.
- 12– In the systems, in which the ozone generator is used, an additional oxygen generator should be used for each generator system exceeding 2.500 m<sup>3</sup>/h. The ozone generators, in which the oxygen generator is employed produce much less nitrous oxide and nitric acid compared to the ones, in which the oxygen generator is not employed.
- 13 – The filter (electrostatic) at the point of emitting into the atmosphere of the exhaust line should be protected against fire and overcurrent.
- 14 – Obligation of heat recovery unit required by Ecodesign; –
- 15 – if the ozone generator is employed in the exhaust air system, Run Around heat recovery system should be employed. If an exhaust system without an ozone generator is being designed, plate heat recovery unit should be used.



## ► Usage Features

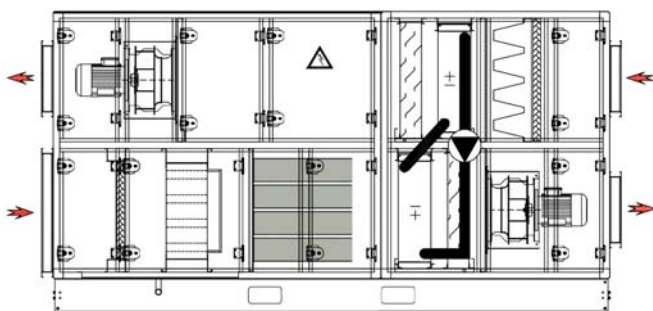
- Exhausts the cleaned cooking gas and steam collected by hood system in the kitchen during cooking.
- In the heat recovery model, the hot air formed in the kitchen is transferred through the heat exchanger and without mixing with fresh air, it is conditioned and transferred into the hood environment. This saves energy.
- In the model where DX coil is used in the fresh air line, it is connected to the outdoor unit and thanks to the bypass damper it cools the kitchen environment.
- After recovering the heat in the exhaust air, it increases the temperature of the fresh air with optional electric heater.
- Low energy losses thanks to DX-VRF system.
- Purifies the dust and particles in the environment using G4 and/or F9 filters in the fresh air line.
- Exhausts the kitchen gases and oils developed in the exhaust line with a cleaning rate of up to 99% thanks to the ozone generator, the metal filter, the electrostatic filter and the activated carbon filter. It provides minimum odor emission.
- Minimum environmental pollution, prevent dirty and greasy air out of the chimney.
- Provides minimum loss of efficiency and energy consumption.
- Extends the life of the fan and filter thanks to air handling unit feature.
- Relevant investment cost, offers a fast and easy solution. Operating costs are low.

## ► Hood Exhaust Models



### Free Heating

The Hood Plant with 100% Fresh Air Plate & Heat Recovery

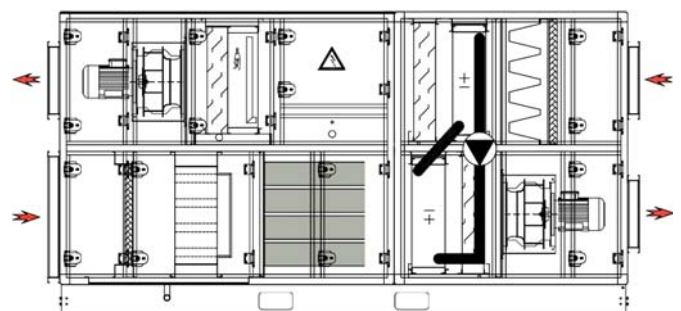


### Free Heating

The Hood Plant with 100% Fresh Air Run Around Heat Recovery

### Free Heating

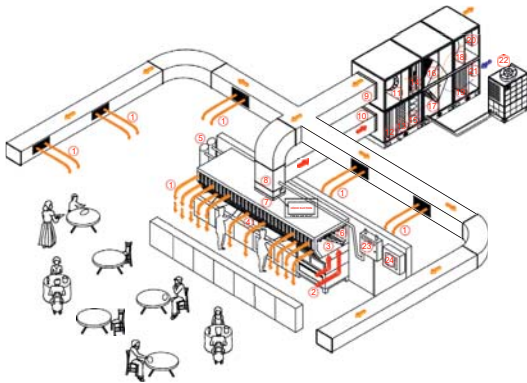
Plate Heat Recovery with 100% Fresh Air - Hood Plant with DX Coil (the water heating coil, the steam coil, the water cooling coil can be used preferably)



### Free Heating

Run Around Heat Recovery with 100% Fresh Air - Hood Plant with DX Coil (the water heating coil, the steam coil, the water cooling coil can be used preferably)

## ► The Hood System



## ► Airplus Hood System Structure

### a) Channel Structure

1. Fresh air inside blowing

### b) Hood Structure

1. Fresh air inside blowing
2. Furnace air suction
3. Metal filter
4. Hood oil drain
5. Fire extinguisher tubes
6. Fire extinguisher nozzles

### c) Channel Structure

7. The blowing and suction channels designed nested
8. Fire damper with 150 °C fuse
9. Fresh air inside blowing
10. Hood air inside suction

### d) Plant Structure

1. Inside throw fan
2. Metal filter (drainage and pan)
3. Electrostatic filter (drainage and pan)
4. DX coil
5. Activated carbon filter
6. Plate heat recovery
7. By-Pass Damper (servo motor controlled)
8. Inside suction fan
9. G4 cassette filter
10. Exhaust vent (emitting into the atmosphere)
11. Fresh air inlet
12. VRF outdoor unit
13. Ozone Generator

### e) Automation structure

24. Automation panel

## ► Hood Structure

It is manufactured from 316 grade stainless sheet as one way (wallside type) and duplex (mid-kitchen type). A fresh air inlet is made from the vertical and slanted point at the outside of the hood to the kitchen indoor part. And it carries out the hood suction from inside. The hot and oily air passes through the cross metal filter part. The oil captured by the metal filter is taken outside via the drain line. Thanks to the plate heat exchanger in the unit structure, the hot air passing through the hood carries out heat transfer without mixing into the air line, thus saving energy. By this means, the greasy air, which occurs owing to the cooker is cleaned in the coil and exhausted when giving the conditioned hot air to the kitchen location in winter.

The hot and greasy air passing through the hood thanks to the By-Pass Damper in the unit structure is cleaned in the unit and exhausted without mixing with the fresh air and passing through the plate heat exchanger in winter. And the fresh air to be sent to the kitchen location is cooled down by passing it through DX coil and sent to the kitchen location side.

The kitchen location comfort conditions are provided by saving energy thanks to the system. It is effective for persons working at the cooker in the kitchen. The fire extinguishing nozzles and installation to extinguish the fire starting at the cooker are available in the hood, and offers ideal air conditioning solutions for kitchen applications with its compact structure and DX coil - outdoor unit option. Automation is on the unit's panel.

## ► Channel Structure

The division from upper part of the hood to the inside suction opening consists of nested two channels. By this means, single entry is carried out to the hood. The inside channel and the outside channel are used to clean the air drawn from the hood in the plant, then vent to the atmosphere, and to give the fresh conditioned air from the outer wall of the hood to the kitchen location, respectively. There is a fire damper with 150 °C fuse for the purpose of providing protection a probable fire in the cooker, human health, the plant and the system. During a fire condition, this damper closes, thus decreasing the oxygen amount in the kitchen location, thereby preventing the fire from spreading and flowing into the plant.

## ► Plant Structure

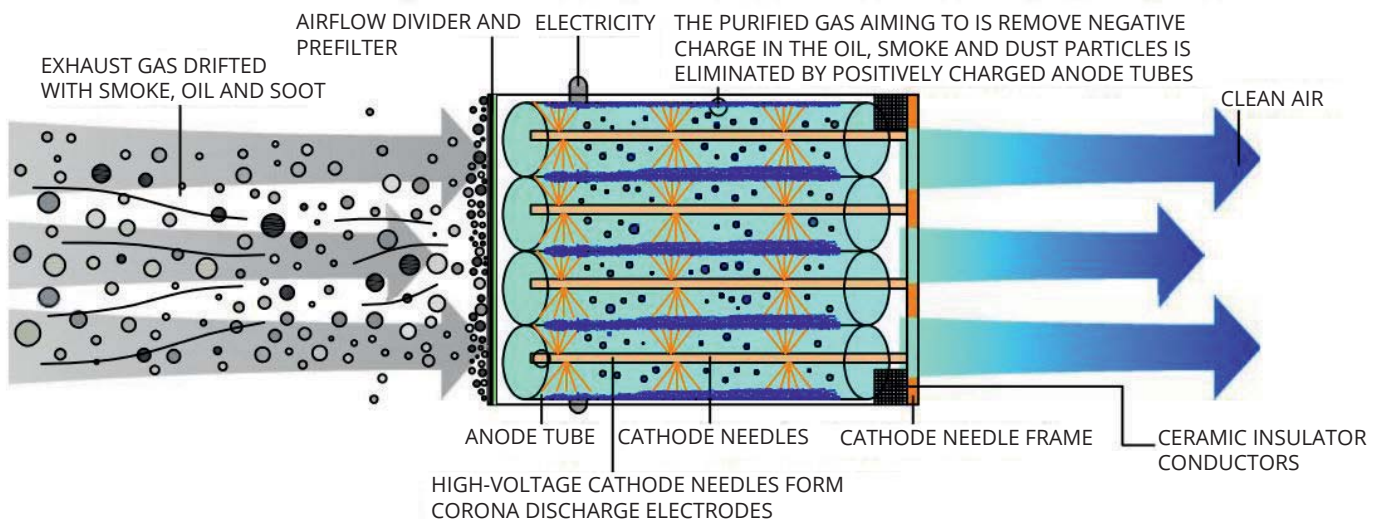
The suction and expel fans are made of leaned-backward sparse-bladed metal material, and the motor divisions are insulated in a way they will not be exposed to air stream. The greasy and smelly air in the exhaust line of the plant is passed through the metal filter, electrostatic filter, and activated carbon filter, respectively. The metal filter, the electrostatic filter, and the activated carbon filter are used to hold the greasy particles, to filtrate the greasy particles and soots, and to filtrate the odor-emitting toxic gases with its feature to grab and hold gas molecules, respectively. The oil accumulated in the drain pan below the metal filter and the electrostatic filter is expelled from the plant.

The plate heat exchanger recovers a part of the heat energy of the cleaned hot exhaust air, and transfers it to the fresh air. During this operation, the airs in the two lines do not mix. While the outgoing air from the cooker is cleaned and exhausted, the kitchen location side is heated with the heat recovery of the fresh air. And the operation of cooling the kitchen location is ensured by closing the heat exchanger by the By-Pass Damper found on the surface of the plate heat exchanger, directly cleaning and exhausting the exhaust air, and passing the fresh air through DX coil. VRF outdoor unit is used for this operation. In restaurants and commercial kitchens using deep fryer, grille and wok, a highly functional air cleaning system is required. This system should definitely be fireproof. A high cleaning capacity is needed in order to alleviate the oil and cooking odors in the hood. The ozone generator is used to remove the greasy air streams in the hood.



## ► The Electrostatic Filter

Function of this filter is to dissociate the particles from the exhaust gases by applying electrostatic charge to smoke and soot particles by the means of the electrons emitted from the cathode division by applying an energy field created by the high voltage to the negative ions produced by mixing together and colliding the electron and air molecules. By keeping the negative charged particles in the positive charged anode division, the negative electrostatic field created by the the power supply makes sure that the decomposed exhaust gas goes out to outdoor as cleaned.





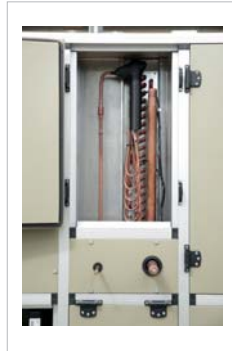
## ► The Activated Carbon Filter

The Activated carbon filter has the feature to grab and hold the gas molecules. The surface of the activated carbon filter consists of millions of small pores. Thanks to these pores, many odor-emitting toxic gases are caught. The activated carbon filters are replaced depending upon the air pollution of the environment, in which they are used, and frequency of use.



## ► Advantages of Airplus Hood Systems

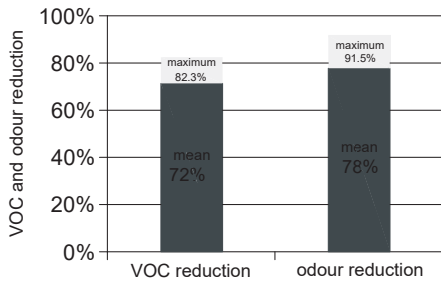
- It has a package structure (cleaning and expelling to the atmosphere the kitchen air, conditioning the kitchen location air), and makes sure that a number of tasks are carried out by a device.
- It is an ideal solution designed for double walled hood systems.
- The device life is extended since the fan motor section is not exposed to air stream during the operation of passing the exhaust air through various filters, and cleaning and expelling it to the atmosphere.
- Service and cleaning of all the elements found in the device are carried out easily thanks to the ergonomic and sledged design.
- Stable operation is ensured with the frequency inverters, which can be used in fresh air and exhaust line, and required hood air velocities are caught.
- With heat recovery, the double wall hood, DX coil-VRF outdoor unit application, it decreases the initial investment and operating costs up to 30%.
- Prevents environmental pollution thanks to the filters used.
- Saves energy.
- Assures safety with the fire-extinguishing system found in the double wall hood.



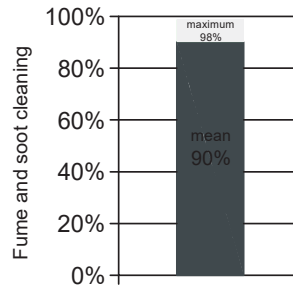
## ► The Ozone Generator

As required by its structure, ozone gas reacts to organic gases, and thus has an effect to disintegrate the cell walls of organisms, and for this effect It has been used in commercial kitchen exhaust systems. Airplus is one of the leading companies, which has been developed and used this technology in its systems. Since the ozone gas is not stable, thus cannot be stored, and started to be used from the moment it produced, this technology produces ozone with the help of ozone generator, adopts it to the system, and uses it securely. Airplus hood plant uses this system starting from the output channel, through the flue to the hood plant exhaust inlet; during this travel, to prevent all the flue interior surface from getting greased, and in the meanwhile, to decrease the odor concentration, increases the efficiency of the electrostatic filter of the hood plant. Besides increasing the efficiency, this ozone application prevents getting greased in-flue and thus eliminating the need for flue cleaning and fire risk resulting from getting greased.

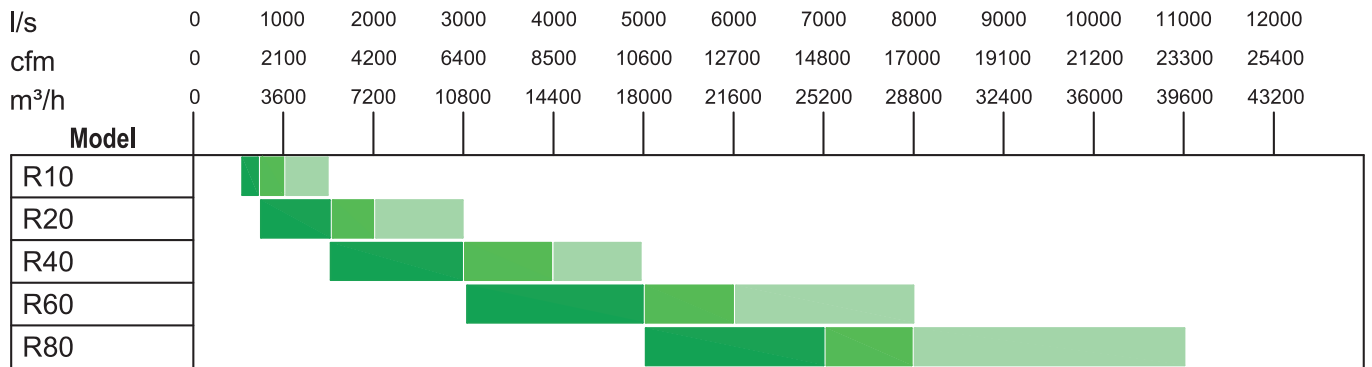
## Ozone Generator Efficiency



## Electrostatic filter efficiency

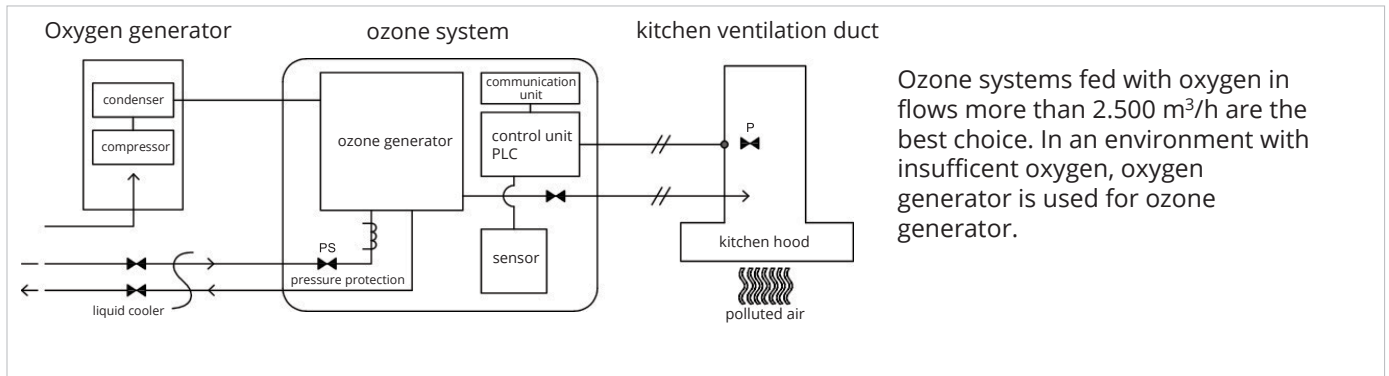


## AIR FLOW



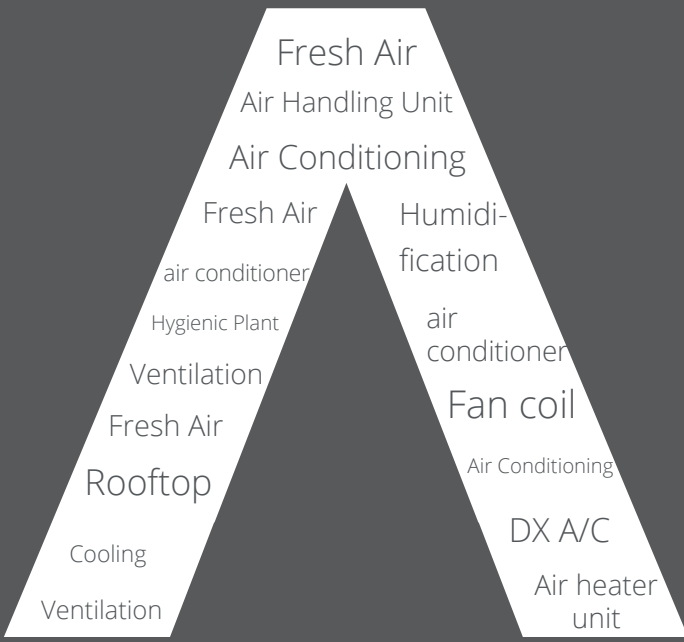
Ozone generators provide high performance. They are fed with dry pure oxygen and cooled with liquid. EN 16282: "An ozone generator, which is fed with oxygen in total exhaust flow of more than 2.500 m<sup>3</sup>/h, will be used to provide protection against nitrous oxide and nitric acid accumulation in exhaust air."

- High grease charge
- Medium grease charge
- Low grease charge





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## Airplus İklimlendirme Teknolojileri San. Tic. Ltd. Şti

Sırapınar Mah. Beykoz Cad. Çanakçı Dere Mevki  
No:99-3 Çekmeköy - İstanbul

Tel : +90 (216) 420 65 58  
Faks : +90 (216) 420 65 59

[www.airplus.com.tr](http://www.airplus.com.tr)