ADV Next Air Air Handling Systems

The evolution of air handling

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ADV Next Air: the tangible solution to the evolving air handling requirements

2016 marked the year of creation of the new air handling idea by Rhoss, ADV Next Air. When ideas encounter technology, innovation takes place. This together with our thirty-years of experience in the sector leads to the new innovative line of air handling units that looks to the future of air conditioning. The strength of the product lies in the use of creative and innovative engineering solutions, preserving the qualitative excellence and the reliability traits that have made Rhoss a well-known name. The fully modular nature and the wide range of configurations come together in the ADV Next Air range to create perfect balance between customisation and standardisation, flexibility and industrialisation.

Next A



Suitable for all climates!

Thanks to the thorough study of the materials and the excellent care paid to thermal decoupling, we are able to guarantee no formation of condensate in a very wide range of temperature and humidity values. Thermal bridge factor class TB1. Our outdoor units offer excellent resistance to both the ambient conditions and UV rays, thus ensuring unaltered performance over time.

Zero waste

The perfect fit of the panels, the valuable gaskets and the single-piece structure are the best guarantee against air leakage. **Tightness class L1.**

The latest generation profiles made of plastic material and the highly efficient insulation panels are the unique solutions we offer in order to eliminate energy waste. **Thermal transmittance class T2.**

Maximum efficiency in minimal space

The entire range conforms to Directive ERP 2018 for UVNR, ensuring sustainable energy savings. Guaranteed energy efficiency with low operating costs.

Integrated intelligence

The Rhoss integrated regulation unit ensures maximum energy savings along with quick connectivity, easy use and management and full integrability with the supervisory systems of the buildings.

The new level of indoor comfort

The special frame of the high tightness filters and the biocide filtration system developed by Labiotest in collaboration with and exclusively for Rhoss Air'suite® Filter are a guarantee for the users' well-being.







ONE-OF-A-KIND Features that make A difference

Innovative structure

It is also thanks to its innovative structure that the ADV Next Air range is able to obtain such high performance levels. This consists of a single-piece 50 mm thick sandwich panel. Both the inner and outer surfaces are made of heat-galvanised sheet steel and coated with polyurethane varnish. The insulation is made of self-extinguishing injected polyurethane (PUR) with 47kg/m³ density that offers excellent thermal and acoustic properties.

The fixing profiles are made of PVC-RAU, a latest generation plastic material, specifically designed for outdoor use and consequently, highly stabilised to optimally resist exposure to sunlight (UV rays) and atmospheric agents, ensuring outstanding resistance to ageing. The inspection doors are full-face type to facilitate machine maintenance. Their special step profile makes it possible to incorporate a double insulating gasket with high compression resistance. The coupling system between the sections is of continuous male/female type along the entire perimeter.

Both these elements ensure utmost air tightness and prevent humidity, water or any other unwanted element from seeping inwards.

Comfort is standard

Each module is equipped with the following settings:

- Pressure fitting that allows and facilitates the assembly of the sensors that measure aeraulic performance required by the commissioning activities, as specified in the reference LEED guide.
- Size of holes for the passage of signal or power cables protected internally and externally by a multi-hole cable gland IP 65D in order to prevent altering the mechanical performance of the machine and facilitate on site operations.



Climate and thermal bridges

Even in everyday operations, adverse weather conditions or technical installation rooms where high temperatures or high humidity levels are reached, may give rise to the formation of condensate on the surface of the structure of the AHUs if the technical characteristics in terms of isolation from thermal bridges are poor. The risk of condensation of a structure is definitely determined by its quality related to the thermal bridges (kb factor) and there are considerable differences between the thermal bridge classes. On the contrary, the insulation characteristics, such as density, insulation thickness and thermal conductivity, are less important. It is the quality of the thermal decoupling of the entire structure that plays a crucial role.

Thanks to the thorough study of the materials and the excellent care paid to the thermal decoupling of the structure, we are able to guarantee no formation of condensate in a very wide range of temperature and humidity values, during both the winter and summer seasons, reaching the best thermal bridge factor class TB1. Our outdoor units offer excellent resistance to both the elements and UV rays, thus ensuring unaltered performance over time.



WINTER SEASON

Example with a unit installed indoors, in a technical room with an air temperature of 20°C. The graph shows at which RH value of the outdoor air entering the machine (in relation to the temperature) condensate begins to form on the surface of the AHU.



SUMMER SEASON

Example with a unit installed outdoors and an air temperature of 14°C after the cold coil. The graph shows at which RH value of the outdoor air (in relation to the temperature) condensate begins to form on the surface of the AHU.



ONE-OF-A-KIND Features that make A difference





The mechanical performance that allows for savings

The perfect fit of the panels, the valuable gaskets and the Rhoss single-piece structure are the best guarantee against air leakage and related energy waste, thus obtaining the best Tightness class value L1. The latest generation profiles made of plastic material with extremely low thermal conductivity and the highly efficient insulation panels are the unique solutions we offer our customers in order to eliminate energy waste. Thermal transmittance class T2. Following heat recovery and fans, these two mechanical parameters are the best allies to obtain instant energy savings as they are directly related to heat and aeraulic dispersions of the machine and consequently, to the thermal and cooling energy consumed.

Actual examples of Energy Savings

Reference AHU: air flow rate 10.000 m³/h Composition: return filter M5, Brushless EC return fan, crossed flow recovery, delivery filter F7, cold coil, hot coil, Brushless EC delivery fan. Presumed cost of electricity: 0,1 €/kWh

Of all mechanical parameters, air leakage is the one that has the highest impact on the energy cost of an AHU (overlooking issues related to indoor air quality). In fact, this parameter is directly related to additional energy costs for ventilation, heating and cooling needed to compensate for the inlet or outlet leakage air flow rate. Going from an L3 leakage value (reference market standard) to an L2 value results in **annual energy consumption savings of 2%**. Going from an L2 value (which is already high compared to the reference standard) to an L1 value results in **additional savings of 0,9%**. Moreover, the graph also shows the trend of the relationship between economic savings attributable to less energy consumption due to the switch to a better leakage class and the purchase price of the AHU in relation to the hours of operation of the system.

Thermal transmittance is, in turn, a parameter that affects the energy consumption of air handling units and provides a measure of the additional heating and/or cooling energy costs needed to compensate for the higher dispersions of the casing. However, it has a minor impact compared to air leakage, which is **three times heavier**. Going from a transmittance value of T3 to T2 (reference standard for the new machines placed on the market) leads to **average annual savings** in energy consumption **of 0,6%**. Going from a value of T2 to T1 (which can be obtained starting from a minimum panel thickness of 65 m and usually required only for industrial applications) leads to additional **average annual savings of 0,3%**.

The graph shows the trend of the relationship between economic savings attributable to less energy consumption due to the switch to a better transmittance class and the purchase price of the AHU in relation to the daytime degrees.

Focus on the environment

The materials used in the ADV Next Air range have also been carefully selected based on their LCA (Life Cycle Assessment) so as to obtain a low environmental impact during the entire life cycle of the product, starting from the resources used for production.

Our main selection criteria are listed below:

- Lower energy consumption needed to produce raw materials
- Minimum energy required during the production process
- Total absence or very low presence of scrap by-products, emissions into the atmosphere and drainages
- Longer duration of the products Recyclable:

the structural part of the ADV Next Air range basically consists of 3 types of material:

- Metal: internal and external surfaces of the panelling and reinforcement bars that can be fully recycled
- Plastic: profiles in PVC-RAU, handles, clamping elements and pressure fittings. Like practically all thermoplastic polymers, they are extremely suitable for regeneration and the use of new products even after many years of use and they are therefore considered fully regenerable and recyclable.
- Insulation: made of PUR Polyurethane. At present, unlike years ago, there are many possibilities to recycle this material, which is now considered Eco-Friendly.



THE TECHNOLOGICAL Core

Heat recovery

The CROSSED FLOW heat recovery units of the ADV Next Air range are designed to reach a dry efficiency of 73%, in full compliance with the second step of ERP, minimising the air-side pressure drops.

The by-pass damper, also built-in, the recirculation damper housed in the same space, the excellent resistance to differential pressures of the heat exchange pack, and the standard antifreeze protection for the Full Plug&Play version allow for excellent annual efficiency and optimal operation during all seasons.

Our ROTARY heat recovery units offer extraordinary efficiency in tight spaces.

We offer two types of heat exchangers: one for recovery of sensitive heat, more suited to winter or dry climates and the other able to recover even the portion of latent heat, thereby allowing for pre-dehumidification during summertime and pre-humidification of the delivery air during wintertime, thereby considerably reducing overall consumption of the HVAC system.

The cleaning sector, the careful selection of the hygroscopic material used and the careful design of the gasket system minimise the risk of contamination of the two flows, thus confirming the attention paid by Rhoss on all aspects

The rotation speed regulation unit can be either of constant or variable type, in order to be adapted to all system requirements.

Both heat recovery units are available in the version with or without the recirculation damper and for full and total recovery of outdoor air.

Fans

For this range, Rhoss makes available to its customers three types of fans in order to meet all system requirements:

- Centrifugal fans with belt and pulley connection
- Plenum fans, which can be coupled directly
- Brushless EC fans
- All the selected impellers offer excellent performance from both energy and acoustic aspects. All fan types have been selected by optimising the work point.
- The fan impeller, directly coupled to AC or EC motors,





is made of a latest generation composite material that guarantees unbeatable performance at energy efficiency, acoustic impact, corrosion resistance and lightness levels. They are equipped with a reading point of the differential pressure for accurate and immediate control of its performance.

- Electric motors, both with AC and EC technology, and the combined inverters provide extremely high efficiency, thereby guaranteeing unbeatable cost savings.
- The motor fan units have an excellent degree of balance, ensuring minimal vibrations and guaranteed performance over time.

Special filter frame

The achievement of suitable filtration degrees assigned to air handling are not only related to the efficiency class of the filters but also to the leakage degree through the frame of the filtration sections.

The ADV Next Air range is equipped with a special frame consisting of a very thick metal structure that incorporates a clamping mechanism that keeps the filtration cells perfectly in contact with the gaskets mechanically inserted along the entire frame perimeter and which guarantee:

- Excellent resistance to ageing
- Wide range of operating temperatures
- Low permanent tensile and compression deformation: this way, one can reduce the bypass of dirty air around the frame itself to percentage values lower than 0.5, allowing filters up to filtration class F9 to be installed.

This frame also makes it possible to remove the filters from the side in complete safety, with the significant advantage of reducing the length of the machines and facilitating routine maintenance and filter replacement operations.



Air'Suite[®] filter biocide filtration

The term "biocide filtration" refers to a combination of granular filtration (traditional) and inactivation of the biological charge (innovative). This process is obtained by using a new bio-polymer duly functionalized and characterised by: excellent availability in nature; biocompatibility; non-toxicity; intrinsic properties that prevent infections.

Using the Air'Suite[®] filter allows additional decontamination from microbiological agents to be obtained (bacteria, moulds, viruses, algae, etc.) of the air and of the same filtration device, offering the following advantages:

- Contamination by "proliferation" of algae, moulds, fungus or bacteria on the filter surface is completely inhibited;
- The filter self-decontaminates and does not become a source of contamination;
- Any release of biological matter in the air ducts is not active, consequently it cannot proliferate.

The Air'Suite[®] biocide filters are available in the following degrees of filtration:

- Cell filters: G4 (EN 779:2012)
- Bag filters: F7 F8 F9 (EN 779:2012)





TOTAL PERFORMANCE CONTROL

Energy efficiency, pressures, air flow rates, temperatures, humidity, operating periods and alarms are always under control.



ENERGY SAVING

- Automatic management of the heat recovery systems both in temperature and enthalpy
- Built-in "free cooling" and "free heating" functions
- Cascade control of the heating/cooling devices
- Holiday and special day functions, with reduced set-point



UTMOST COMFORT

- Temperature and/or humidity control with different seasonal set-points
- Compensation of the seasonal set-point
- Operation in comfort, pre-comfort or economy mode
- Management of the water temperature minimum limit;
- 4 daily time bands
- Automatic summer/winter, manual or based on the water temperature



SAFETY AND MAINTENANCE

- Automatic management of the coil antifreeze protection
- Automatic management of the heat recovery system defrosting
- Safety protection for dirty filter alarms, smoke/ fire alarms or alarms due to no air or water flow



FOLLOWS THE SYSTEM REQUIREMENTS

- Fan inverter check at constant speed, air flow rate or pressure or based on air quality
- \bullet Air quality check with CO_{2} and VOC probes;
- Management of 3 or 2-way modulating or pressure independent valves
- Management of pumps for the pre-heating/ cooling/post-heating coils



CONNECTIVITY

The ADV Next Air range features all the functions offered for Rhoss products:

- Rhoss MONITORING: Remote monitoring through Mobile-Cloud-Real time
- Rhoss WEB SERVER: Control and monitoring via ETHERNET
- Rhoss SUPERVISOR: "All in one" supervisor & "Touch screen"
- Rhoss TOUCH MANAGER: Integrated system management

Moreover, the range can be fully interfaced and integrated with third-party BMS systems through: Modbus, LonWorks and BACnet protocols.



Version Full Plug&Play

The ADV Next Air range is also available in the Full Plug&Play version, which fully incorporates both the electrical power and control part and machine management, thus obtaining utmost comfort and minimum energy consumption. The Rhoss offer also includes all field components and elements needed for optimal control and management of the AHU.



INCLUDED SERVICES

- Electrical design, set up of the control and power electrical panel and supply of wiring diagrams
- Development and implementation of the control and programming logic of the regulators
- Selection in sync with the machine and the control logics of all field elements (probes, actuators, valves, pressure switches, etc.) as well as their mechanical assembly and wiring
- Factory test
- First start-up by a qualified Rhoss technician

Smart Wiring

Wiring consists of quick-couplings made according to the most recent technology available on the market. The peripheral devices communicate with the regulator via Modbus; this allows the system to be easily connected while retaining full control over all the parameters. These one-of-a-kind solutions make the system very cost-effective in terms of installation, inspection and commissioning. This way, the unit can be easily pre-wired at the factory, and the individual modules can be simply disconnected and separated for transport purposes prior to being reconnected on site.

Total quality in less time

Assembling the regulation unit at the factory also means having free access to all the components, thus avoiding any problems in terms of restriction to components that usually take place on site, for faster delivery of the finished machine. All the field probes and elements have been pre-engineered to determine the best assembly position, thus ensuring precise and reliable readings.

100% reliable

When the regulation systems are installed on site, there is usually an increase in the overall costs compared to the estimated ones, as well as a reduction in the degree of system reliability due to the work of different individuals during the assembly, wiring, programming and start-up phases. The Full Plug&Play version solves all these problems since the Rhoss regulation unit is designed, installed and tested at the factory, thus eliminating any uncertainty on site and transferring all responsibility to the manufacturer.

The Factory Test also guarantees that all cables are properly connected, that all control panels and terminals function correctly and that the regulation logics are in sync with the other elements installed on the machine and with the system specifications provided by the designer. ADV Next Air: guaranteed energy efficiency with low operating costs



ERP 2018 Ready

Thanks to a design phase aimed at minimising the air side pressure drops and thus the energy consumption of the fans and the adoption of top quality technical solutions and components the ADV Next Air range fully meets all the requirements introduced by European Regulation 1253/2014/EC of both the first (2016) and the second (2018) implementation step.



A+, A, B choose the class you like the most

The aim of Eurovent energy labelling is to offer customers and users a "simple" and logical method for evaluating the energy quality of the air handling unit in order to assist them during their purchase decision. The energy classes incorporate the requirements of Directive ERP and the basic calculation criteria are efficiency and pressure drops of the heat recovery units, the air speed in the through section and the efficiency of the ventilation assemblies. The best class is class A+ (distinguished by market excellence) all the way down to class D (which corresponds to the minimum legal requirements).

With ADV Next Air, you immediately know your energy class and whether or not you can upgrade or downgrade it (depending on your needs), by simply changing a few parameters.

Size		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Air flow rates																	
Air flow rate at 1,5 m/s	[m³/h]	890	1.160	1.430	1.770	2.250	2.860	3.610	4.360	5.180	6.070	7.160	8.520	10.160	12.000	14.450	17.730
Air flow rate at 2 m/s	[m³/h]	1.180	1.550	1.910	2.360	3.000	3.820	4.820	5.820	6.910	8.090	9.550	11.360	13.550	16.000	19.270	23.640
Air flow rate at 2,5 m/s	[m³/h]	1.480	1.930	2.390	2.950	3.750	4.770	6.020	7.270	8.640	10.110	11.930	14.200	16.930	20.000	24.090	29.550
Air flow rate at 3 m/s	[m³/h]	1.770	2.320	2.860	3.550	4.500	5.730	7.230	8.730	10.360	12.140	14.320	17.050	20.320	24.000	28.910	35.450
Air flow rate at 3,5 m/s	[m ³ /h]	2.070	2.700	3.340	4.140	5.250	6.680	8.430	10.180	12.090	14.160	16.700	19.890	23.700	28.000	33.730	41.360
External front dimensions																	
Base	[mm]	790	875	975	1.075	1.175	1.275	1.375	1.480	1.575	1.775	1.925	1.980	2.085	2.275	2.535	2.665
Height	[mm]	520	640	720	720	760	840	840	950	1.000	1.100	1.100	1.200	1.320	1.500	1.500	1.680
Crossed flow heat recovery units																	
Recovery at total air flow rate																	
Nominal recovery air flow rate	[m³/h]	1.300	1.700	2.100	2.600	3.300	4.200	5.300	6.400	7.600	8.900	10.500	12.500	14.900	17.600	21.200	24.700
Minimum air flow rate	[m³/h]	600	800	1.000	1.300	1.600	2.100	2.600	3.200	3.800	4.400	5.200	5.800	6.900	8.300	10.000	11.300
Maximum air flow rate	[m ³ /h]	1.700	2.200	3.000	3.700	4.900	5.500	6.900	8.800	10.500	12.300	14.500	17.600	21.000	24.800	29.600	32.000
Dry yield with balanced air flow rates	[%]	73,5	73,2	73,7	69,8	73,4	75,1	75,1	74,9	74,9	74,9	74,9	73,4	73,4	73,4	73,4	73,0
Yield EN 308	[%]	80,5	80,4	79,3	77,3	79,0	80,8	80,8	80,6	80,6	80,6	80,6	79,0	79,0	79,0	79,0	78,6
Recovery at partial air flow rate																	
Nominal recovery air flow rate	[m ³ /h]	650	850	1.050	1.300	1.650	2.100	2.600	3.200	3.800	4.200	5.300	6.400	7.600	8.900	10.500	12.800
Minimum air flow rate	[m³/h]	300	400	500	600	800	1.000	1.300	1.600	1.900	2.100	2.500	2.700	3.000	3.600	4.200	5.100
Maximum air flow rate	[m³/h]	850	1.100	1.350	1.700	2.200	3.000	3.700	4.900	5.500	5.500	6.900	8.800	10.500	12.300	14.500	17.600
Dry yield with balanced air flow rates	[%]	73,5	73,5	73,5	73,5	73,6	73,7	69,8	73,3	73,3	75,1	75,1	74,9	74,9	74,9	74,9	74,9
Yield EN 308	[%]	80,6	80,5	80,5	80,5	80,5	79,3	77,3	78,9	78,9	80,8	80,8	80,6	80,6	80,6	80,6	80,6
Rotary heat recovery																	
Recovery at total air flow rate																	
Sensitive recovery																	
Nominal recovery air flow rate	[m ³ /h]	1.150	1.650	2.100	2.600	3.300	4.200	5.250	6.300	7.500	8.900	10.500	12.500	14.800	17.600	21.200	25.900
Dry yield with balanced air flow rates	[%]	73,0	73,1	74,4	74,9	74,9	74,5	73,0	73,1	73,0	75,2	74,7	73,9	73,0	73,0	73,3	73,0
Hygroscopic recovery																	
Nominal recovery air flow rate	[m³/h]	1.200	1.700	2.100	2.600	3.300	4.200	5.300	6.400	7.600	8.900	10.500	12.500	14.900	17.600	21.200	26.000
Dry yield with balanced air flow rates	[%]	73,3	73,7	75,1	75,4	75,5	75,2	73,9	73,8	73,8	75,7	75,3	74,7	73,9	74,0	74,2	73,8
Recovery at partial air flow rate																	
Sensitive recovery																	
Nominal recovery air flow rate	[m ³ /h]	1.150	1.150	1.150	1.650	1.650	2.250	2.900	3.700	4.600	5.250	5.250	6.300	7.500	10.150	11.600	14.800
Dry yield with balanced air flow rates	[%]	73,0	73,0	73,0	73,1	73,1	73,2	73,0	73,0	73,0	73,0	73,0	73,1	73,0	73,0	73,0	73,0
Hygroscopic recovery																	
Nominal recovery air flow rate	[m³/h]	1.200	1.200	1.200	1.750	1.750	2.400	3.100	3.950	4.900	5.500	5.500	6.750	8.050	10.850	12.400	15.800
Dry yield with balanced air flow rates	[%]	73,3	73,3	73,3	73,2	73,2	73,2	73,0	73,0	73,0	73,3	73,3	73,1	73,0	73,0	73,0	73,0







ADV Next Air: a range of products that can help achieve the LEED® credits



ADV Next Air, full Plug&Play version



Range of air handling units that can be configured with a temperature control system assembled on board.

Version with crossed flow heat recovery Version with rotary heat recovery Version with Plenum fans or EC Brushless

Options

The energy efficiency of the products can be further improved by integrating specific Rhoss accessories and systems.

Set up of pressure reading points								
Hydronic coil meters								
IAQ control								
Spare filters								

KEY:

- WT Witness Test
- The unit meets the criteria of the prerequisite or of the credit / The accessory can help to meet the criteria of the prerequisite or of the credit

Where to use ADV Next Air

Ventilation system for fresh air and air handling in buildings intended for residential, service-trade and tourist accommodation buildings.

PROJECT PORTFOLIO



Rhoss has studied the aspects of the LEED[®] standard and assessed the requirements of the credits, comparing them with the characteristics of its product ranges and identifying those that can meet the requirements of the LEED[®] credits and how. Further to a study of the technical characteristics of its products, Rhoss has carried out an analysis of compliance with the requirements of the credits of the LEED[®] standard. In this way, Rhoss gained the expertise needed to fulfil the LEED[®] requirements and to talk about the subject with potential international customers in an assured manner.

I		Air,	energy an	id atmospl	iere		I	Qualit	y area	
Commissioning and basic checks	Minimum energy performance	Building-level energy metering	Basic management of refrigerants	Advanced commissioning	Optimised energy performance	Advanced energy metering	Answer to the question	IAQ control advance strategies	Evaluation of ambient air quality	
EAp1	EAp2	EAp3	EAp4	EAc1	EAc2	EAc3	EAc4	EQc1	EQc4	
	Prereq	uisites				Cre	dits			
WТ	•	•	•	WT	•	•	•	•	•	
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COMMISSIONING

As the case in point involves the commissioning of a building, the single product is not of direct concern. It is important, however, to consider anything that can help simplify the commissioning process. The Witness Test allows the CxA (Commissioning Authority) to verify and validate operation of the unit and to measure the fan performance at the desired system conditions. The set up of measuring points of pressure, temperature and humidity values significantly facilitate the on site commissioning and TAB operations.

MINIMUM ENERGY PERFORMANCE

Using high-efficiency ventilation and heat recovery systems in air handling units may help achieve the minimum level of energy efficiency for the building and its systems, as required by the prerequisite, and to earn points in terms of EAc2 credit.

The score that can be obtained depends on the percentage of improvement compared to the minimum percentage of the prerequisite. The energy efficiency level must be calculated by using the Energy Modelling mathematical model.

ENERGY METERING

Using meters built into the AHUs at the hydronic coils may help to accurately monitor energy use at both the building and single-user level.

ANSWER TO THE QUESTION

Using Plug&Play units with Plug-Fans or EC Brushless fans allows consumption of electrical motors to be easily regulated, the speed of which can also be controlled in relation to a change in the use of electricity in response to changes in its price or to incentive parameters.

ADVANCED IAQ CONTROL STRATEGIES AND EVALUATION OF THE IAQ

Using static crossed flow static recovery units to avoid contamination between the two air flows, monitoring the CO_2 levels by means of probes and integrated control logics, the double set of filters for replacement prior to clogging, and the integration of ambient air "washing" functions in the control logics are the characteristics/accessories of the ADV Next Air range that can help to meet the criteria of these credits.



Service application, indoor installation. SWITZERLAND



Service application, outdoor installation. ITALY





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