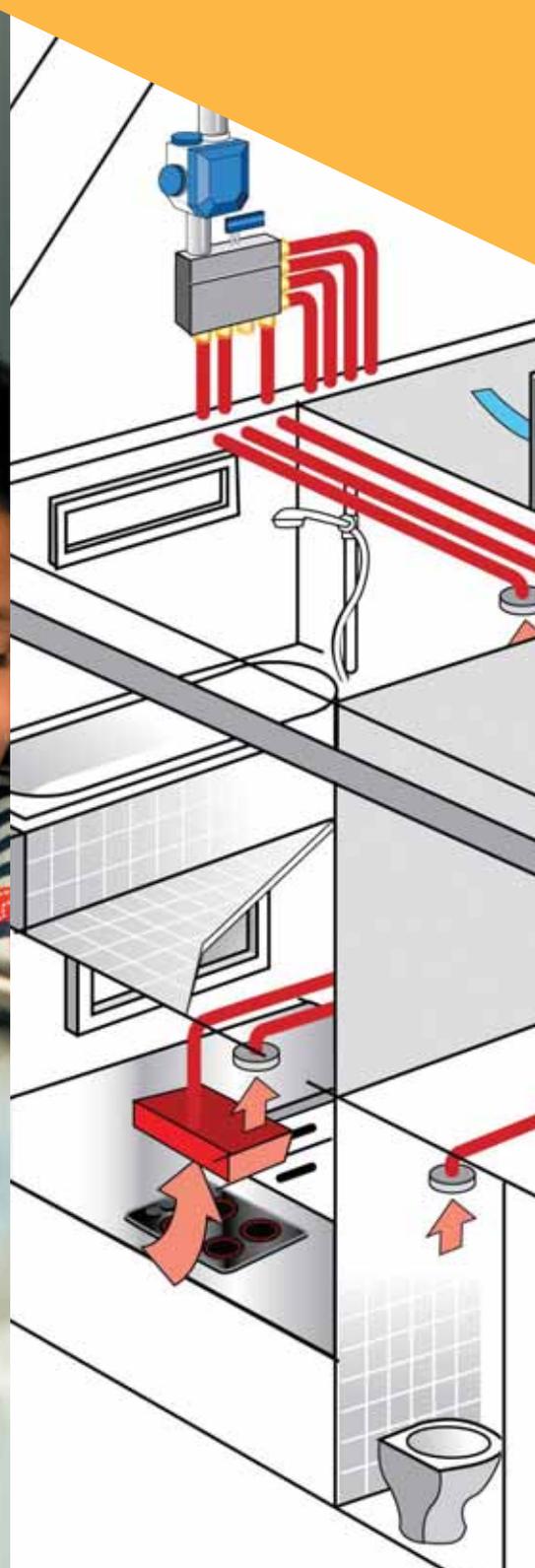


itho

Itho DemandFlow



About Itho

With a long established reputation for manufacturing and supplying reliable, efficient products, Itho B.V has been successfully providing energy efficient climate solutions since 1919. With its UK division – Itho Ventilation Limited, the UK can now take full advantage of its environmentally conscious ventilation systems, perfectly timed for compliance with our ever-tightening building regulations.

Originating within the heart of the Netherlands, the home of clean living, Itho has invested enormously in energy saving technologies and continues to research new ways to improve their products in order to remain one step ahead of Government legislation.

Offering ventilation systems both with and without heat recovery, the aim is to offer solutions that leave your home feeling fresh and comfortable, eliminating unwelcome odours and putting a stop to condensation and all its nasty after effects. Combine this with energy saving technology and Itho are well on their way to becoming the number one choice.

As awareness of the benefits of airtight homes increases, so too does the need for mechanical ventilation and soon every house in the UK will require some form of mechanical intervention. Since the 1960's we have witnessed many



developments within the building industry to help reduce our carbon emissions, and considering that 27% of the UK's total CO² emissions comes from the energy we use in our homes, it is as good a place as any to start tightening the belt.

With the development of low consumption DC (direct current) motors, Itho guarantee that all units fitted with this efficient device will demand less power than that of a standard AC motor, in some cases making a saving comparable to the annual consumption of a standard refrigerator with a freezer compartment. As technology continues to advance, there is no real reason why a product that requires a continued energy supply cannot be energy efficient.

Not just in the business of mass selling, they care about their products and will endeavor to ensure you receive the best

results from your chosen system.

Installation can have a dramatic effect on the efficiency of a product and with their team of qualified installers, Itho can ensure each unit's potential is fully maximised.

In support of its commitment to the industry, Itho Ventilation Limited is a member of the Construction CPD Certification Scheme and run a number of courses on the future of ventilation and installation practice.





Service

Supporting you through the entire process, Itho offers a full service from design to installation and commission to after-sales advice.

Understanding the importance of customer service, Itho is passionate about its products and is dedicated to providing its customers with the best possible care. Whether you have queries regarding a fan that is not running correctly or simply require your filters cleaning, Itho is on hand to help you get what you need.

Guarantees

For every product sold there will be a two year guarantee period which will come into force upon receipt of your new unit. Throughout this period, defective parts will be replaced free of charge, subject to terms and conditions and as long as the relevant guidelines have been followed.



System Care

In the unlikely event of an Itho system developing a fault within the specified two-year warranty period, Itho Ventilation Limited will take full control of the situation to ensure you experience minimal disruption. A qualified engineer will arrange for a home visit to investigate the problem and repair or replace the product immediately, if so required.

This after-sales service is provided completely free of charge subject to the unit proving faulty during further testing.

Maintenance

In order to ensure you get the most out of your chosen ventilation system, Itho can provide you with an extensive maintenance programme including the routine cleaning and replacement of old filters, without you having to lift a finger.



Itho DemandFlow: Demand Controlled Ventilation on the basis of CO² measurements in every room

The indoor climate of our dwellings has to meet increasingly stringent requirements. Not only will the government be making higher demands, the occupants too know exactly what they want. Today and looking to the future, in order to meet these wishes and requirements, dwellings are being insulated to higher and higher standards. Unfortunately, a higher level of insulation is often at the expense of the indoor climate as without proper ventilation, moisture,

mould and dust mites have a free rein. Consequentially, the number of people suffering from breathing related health problems has increased considerably in recent years.

Looking ahead, in order to create a comfortable and energy efficient indoor climate, many dwellings will be fitted with a continuous mechanical ventilation system. The Itho DemandFlow is such a system. This is a demand controlled ventilation system

which ensures the optimum air quality at maximum energy savings without the user having to take any action. This brochure provides you with practical information regarding system design, installation, operation and maintenance of this unique ventilation system.

Why the Itho DemandFlow system?

Maximum comfort through automatic ventilation on the basis of CO² measurements

DemandFlow is a fully automatic, demand controlled ventilation system. Every room is perfectly ventilated without the slightest effort being required of the occupant. Air is extracted not only in all the “wet” rooms such as kitchens, utilities, bathrooms and toilets, but also in all of the “habitable” rooms such as lounges, dining rooms and bedrooms. The rate of ventilation in the dwelling is controlled on the basis of CO² measurements in each room. If a party were being hosted until late at night then the ventilation system would continue to run at maximum power until the early hours. When the occupants go on vacation and the house requires only minimum ventilation the system adjusts automatically and operates at the lowest level.

Lower noise levels

Ventilation takes place only in those rooms that need it. This limits noise levels to the absolute minimum. In addition, there is no need to design in provisions to reduce cross talk as each room has a dedicated duct, which is connected directly into the plenum box. The plenum box has integral sound absorbing material.

High energy saving for a low investment

One of the main features of the Itho DemandFlow system is its remarkable contribution to energy saving. This significant contribution is achieved through a combination of the use of a high efficiency, direct current ventilation unit and by ventilating only those rooms that need it. This considerably reduces heat loss when compared to “whole dwelling” mechanical ventilation systems.

Easy to install in any building concept, even in the latter stages of the construction process.

The Itho DemandFlow system was developed in such a way that it can be installed in virtually all types of houses and apartments and in both new construction and large-scale renovation. It also has a flexibility which means that it is easier to make design changes even near the end of the construction. Routing the ducts through a plenum box makes it possible to add additional extract points or move them to a different location within a room.

What is CO² and what does it mean for the air quality in a dwelling?

CO² is carbon dioxide. The amount of carbon dioxide is expressed in ‘ppm’ (parts per million). In other words, in litres of CO² per one million litres of air.

The amount of carbon dioxide indicates the necessity for ventilation in the presence of humans and animals. When the carbon dioxide which is produced in the dwelling is extracted to an acceptable level, this generally means that the ventilation is also adequate for removing other airborne waste products, such as combustion gases, moisture and volatile organic substances from construction materials.

The average amount of carbon dioxide in the outside air ranges between 350-400 ppm. In a dwelling this rises rapidly due to people and animals exhaling carbon dioxide and the burning of gas for heating and cooking.

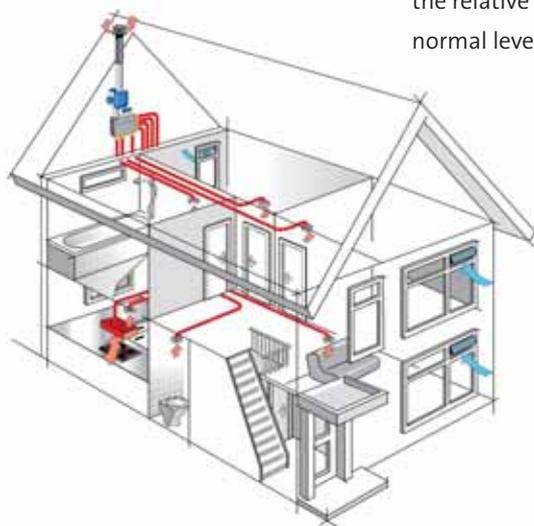
The recommended values for the interior climate range from 1000 (comfort) to 1200 (Eco) ppm, with 1200 ppm being used as a reference for the lowest acceptable quality in current legislation in some countries. When carbon dioxide levels exceed this amount, this creates stale air and may cause health and well-being problems. The amount of carbon dioxide can be reduced through proper ventilation.

In developing the Itho DemandFlow system, we also devoted a great deal of attention to ease of installation during the building process. DemandFlow was developed to eliminate the drawbacks of ducting systems which involve lots of forks and branches.

Easy installation and maintenance

The Itho DemandFlow ventilation system demonstrates that creating the best possible indoor climate does not mean a complicated installation. The use of a combination of 80mm semi-rigid aluminium and 104 x 54 mm modular rigid plastic makes it easy to install. The control valves are 'plug and play' with automatic settings and need no adjustment.

As well as being easy to install the DemandFlow system is also extremely easy to look after with only simple maintenance required by the end user. All the room extract grilles, which are easily cleaned in a dishwasher, are identical and interchangeable, so after cleaning you need not worry about which grille goes where.



How the Itho DemandFlow system works

The Itho DemandFlow system works on a basis of natural air supply and mechanical extraction in every room. All rooms in the house therefore have one or more, air extraction grille which is linked by means of a duct directly to the DemandFlow plenum box. This plenum box is fitted with a number of sensors, one CO² sensor and one or two RH sensors for the bathroom(s). In addition, each duct into the plenum box has its own individual control valve.

The CO² sensor regularly samples and measures the air from every room and as soon as CO² levels rise to the pre-set level the system will automatically boost ventilation in that room. It does this by opening the duct valve for that room and if required turns up the extractor fan.

In addition to this the system also measures the relative humidity (RH) in the bathroom (up to 2 bathrooms). When humidity in the bathroom rises, the system will immediately increase ventilation in this room until the relative humidity is back to a normal level

Compliance in the UK and Ireland

The DemandFlow demand controlled ventilation system, in operation, complies with the ventilation strategy adopted in Approved Document F, section 0.13 – 0.15 for extract ventilation from rooms where most water and/or pollutants are released, either by intermittent or continuous extract; and whole building ventilation. The quiet operation of this system also meets the reference for minimising the noise levels in section 0.32 and the Control of Ventilation in sections 0.18 – 0.19 where humidity controlled devices are suggested to regulate the humidity of indoor air and minimise the risk of condensation and mould growth.

Additionally, the ventilation unit used by this system is the Itho CVE ECO 2 HP which is a SAP Appendix Q Eligible MEV and in many installations will comply as "Continuous Mechanical Extract" as outlined in System 3 of Part F of the England and Wales Building Regulations

The system has been surveyed at the Netherlands TNO, report number 2008-D-R0099/B-S, as being capable of maintaining an optimal indoor air quality.

Parts of the Itho DemandFlow system

The plenum box with the control valves is the very heart of the DemandFlow system. Here the amount of CO² plus the relative air humidity is measured, which results in an adjustment of the ventilation in relation to the values measured. However, the DemandFlow system contains more components, each making an individual contribution to the maximum comfort offered by the DemandFlow system.

DemandFlow plenum box, type DF-P

The DemandFlow plenum is the central unit of the system. Here the control valves and the sensors for measuring the air quality in the different rooms can be found. The air quality of the habitable rooms is measured by a CO² sensor. The air quality in the bathrooms (a maximum of 2) is measured by an RH sensor. This unique measuring system has been developed by Itho and

patented under number 1026242. A maximum of 12 x 80mm ducts can be connected to the DemandFlow plenum and easily routed throughout the dwelling. The connection to the extract unit is by a 125mm duct at the top of the plenum. To ensure that the operation is ultra quiet the DemandFlow plenum is fitted with sound-absorbing material. The DemandFlow plenum is available in 12 or 8 connection units in either a floor/wall model or a ceiling model. For extensive technical information, please refer to the DemandFlow Plenum Box product sheet.

Valves, type DF-K

Every duct is connected to the DemandFlow plenum box by means of a click-on system and every connection has its own valve (type DF-K) to regulate the airflow. The valve cables are connected to the controller by

means of a connector.

For extensive technical information, please refer to the DemandFlow Regulator and Accessories product sheet.

Central controller type DF-R

All control valves in the DemandFlow plenum are connected to the central control switch (type DF-R) by means of a connector. The control switch controls all valves and the ventilation unit and measures all sensors in the plenum. The control switch is connected near the DemandFlow plenum and has a dedicated cord.

For extensive technical information, please refer to the DemandFlow Regulator and Accessories product sheet.



Plenum box with control valves



Ducting Types



Controller



Operation

The Itho DemandFlow system is fully automated. However, the level of ventilation can be controlled by means of wireless RF remote control. The setting which is selected via this control applies to the entire system. The following modes are available

- Eco (1200 PPM)
- Comfort (1000 PPM)
- HR cooker hood -Timer

In Eco mode, the system will continue to ventilate until CO² levels have dropped below 1200 PPM. The level of ventilation depends on the extent to which the number of PPM is exceeded. This process is fully automated. In comparison, CO² levels in the open air range from 350 to 400 PPM, depending on the surroundings and the season. For further information on the indoor environment see “What is CO² and what does it mean for the air quality in a house”, elsewhere in this brochure

After a fixed period, the motorless HR cooker hood will be automatically switched off. The timer mode ensures that ventilation in the living room or the kitchen is temporarily increased (night-time ventilation). When the occupant presses the timer function once, the system ventilates in the higher ventilation mode for a period of 3 hours. When pressed twice, the system will ventilate in the higher mode for a period of 6 hours. For extensive technical information, please refer to the user manual.

Ventilation unit type CVE ECO 2 HP

The unique central extract ventilation unit CVE ECO 2 HP regulates the mechanical extraction of air. This extract unit is fitted with an electric cord and an integral RF receiver is fitted in the unit (optional PCB). The latter ensures that the central control switch controls the ventilation unit wirelessly. For extensive technical information, please refer to the CVE ECO 2 HP Brochure.

Roof Termination DDV

In order to maximize the extraction return in a mechanical ventilation system, you need to reduce the loss of pressure. Therefore an important factor is what connection is used from the unit to the internal. It is recommended that the extracted air is discharged by means of a DDV type connector. To make optimum use of the extraction capacity of a mechanical ventilation

system, it is imperative to limit pressure loss. Therefore when terminating through the roof it is important that the DDV Termination or similar is used to transport the maximum amount of air.

For extensive technical information, please refer to the DDV product sheet.

Ducts

The Itho DemandFlow system can be installed using the following types of ducting:

- Ø 80 mm semi-rigid aluminium(plus Ø125 to connect both sides of CVE ECO 2 HP)
- plastic flexible ducts from Muelink & Grol)
- 110mm x 54mm Rigid Modular Plastic.

By fitting these types of ducts without abrupt transitions the formation of

turbulent areas is minimised or even prevented. This reduces the loss of pressure and contamination is virtually non-existent and also making the duct system easier to maintain. The maximum air volume per duct is 75m³/h at an airflow speed of 4m/s.

Air extraction vents

The grilles for the air outlet are fixed and cannot be adjusted. The major advantage of this is that it is very easy for the user can to clean the grilles without disturbing the system due to an incorrect setting or replacing the grille at a place other than where it came from. The amount of air that is extracted by the grille is determined by the amount of contamination (CO²) in the relevant room.



Control panel



CVE ECO 2 HP



DDV roof termination



Air Extract Grilles



HR High Efficiency Cooker Hood



Pressure Sensitive Background Ventilators

Bathroom

The amount of air that is extracted from the bathroom is determined by the percentage of relative humidity (RH) in that room in combination with the temperature and/or the level of contamination (CO²). A maximum of two bathrooms can be connected to the system by this method

HR High Efficiency Cooker Hood

Connecting a motorised cooker hood to a central extract ventilation system is not permitted. Itho has therefore developed the high efficiency cooker hood which is also suitable for the DemandFlow system.

The HR cooker hood is connected to the dedicated connection in the DemandFlow plenum box and the kitchen air extract grille moved to another. The RFT control switch has a

separate button for the cooker hood.

When switched on by the user, the HR cooker hood extracts 125m³/h. This ensures an optimum performance by the cooker hood.

For extensive technical information, please refer to the Itho High Efficiency Cooker Hoods brochure.

Pressure Sensitive Background Ventilators

The natural supply of air for the system is provided by Pressure Sensitive Background Ventilators which are usually sited within or over the window frame. These are placed in habitable rooms only and ensure that a positive air path is created throughout the dwelling, towards the “wet” rooms. The ventilators are fitted with pressure sensitive valves which open to let air in when the internal pressure drop is 1 or

2 Pa. These valves add to comfort and reduce the incidence of noise and unwanted cold draughts as they are designed to resist the external pressure created by winds. Therefore the user is less inclined to close the background ventilator.

For extensive technical information, please refer to the product sheet provided by your supplier of Pressure Sensitive Background Ventilators

Design of the system



To comply with current government regulations all standards and legislation have to be taken into account in designing the ventilation system. In particular the rules relating to ventilation capacities are highly important.

Ventilation calculation

Regarding the ducts, the designers have to calculate the amounts of air extracted from the bathroom, toilet, kitchen, utility, bedrooms and the living room. In addition to the known permeability of the building fabric the air supply enters the house through Pressure Sensitive Background Ventilators. These airflows must always be well balanced.

A ventilation calculation therefore has to be made for the installation of the Itho DemandFlow system. This calculation is needed for:

- the duct design
- determining the necessary number of units
- determining the number and type of extraction and supply components
- determining the distance between the ventilation extract and the fresh air supply

A ventilation calculation can be made as follows:

- determining the necessary extraction capacity
- determining the necessary supply capacity

- determining the internal airflows (flows to other rooms)

Duct design

The ducting can be designed on the basis of the ventilation calculation. It is also necessary to make a pressure loss calculation.

The ducting system must meet the following criteria:

- use of the right air extract grilles
- use of the right self regulating, pressure sensitive background ventilators.
- a maximum airflow speed of 4.0m/s or less (ISSO-62 Standard/GIW/ISSO 2007)
- the total resistance of the ducting system must be less than the maximum resistance that can be dealt with by the extractor unit

DEMANDFLOW - EXTRACT INSTALLATION OPTIONS

	2 Bedroom Apartment/House	Houses			
		3 Bedrooms		4 Bedrooms	
		Open-plan	Kitchen Closed-plan	Open-plan	Kitchen Closed-plan
Bathroom/toilet 1	1	1	1	1	1
Toilet		1	1	1	1
Kitchen	1	1	1	1	1
HR hood	1	1	1	1	1
Utility		1	1	1	1
Bathroom/toilet 2				1	1
Living room	1	1	1	1	2
Bedroom 1	1	1	1	1	1
Bedroom 2	1	1	1	1	1
Bedroom 3		1	1	1	1
Bedroom 4				1	1
Total connections	6	8	9	11	12

Air movement within the dwelling

In order to ensure that the ventilation system performs well there must be an unrestricted airpath within the house. The inner doors must have undercuts of sufficient size in order to allow movement of the air. For example: Table 1.4 of Part F Ventilation (England & Wales) states that there should be an undercut in all internal doors equivalent to an undercut of 10mm

As standard, the Itho DemandFlow system has plenty of options to enable sufficient connections for most standard dwellings. The system can easily be extended to accommodate larger houses with additional rooms by installing additional adapters (max. twelve adapters).

Notes

A garage referred to as a storage area

A storage area with a garage door is, despite its name, considered to be a garage. Therefore such rooms cannot be connected to the Itho DemandFlow system.

Potential bedroom

An undefined room is often referred to as a future optional bedroom. This needs to be taken into account in the ventilation calculation, as this could affect the total volume of air extraction and air supply.

Possible future extensions/adjustments

Extensions and adjustments to the plans for the dwelling could have consequences for the total air balance calculation. It is therefore imperative that new ventilation calculations be made for dwellings that are to be extended or altered in any way, to assess the consequences.



Installing and starting up the system

The DemandFlow system consists of many parts. These parts are installed at different stages of the construction.

Installation in shell construction stage

The plenum box and ducts are installed during the shell construction stage.

DemandFlow plenum box

The DemandFlow plenum box can be installed on either the floor or the wall. A separate ceiling model is available for high-rise buildings.

Ducts

For further information on the installation of the ducts, please refer to the CAD plans showing the layouts..

Roof Termination

For further information on installing the roof termination, please refer to the DDV product sheet.

Installation at Fitting Out stage

The following components are usually installed during the Fitting Out stage:

Ventilation unit, type CVE ECO 2 HP

The ventilation unit can be installed in any position and in various locations in the house, such as:

- attic
- airing cupboard
- storage area

The unit has to be mounted on a wall with a mass of at least 200 kg/m². Please also refer to ISSO publication 62.

The RF printed circuit board, the means by which the controller wirelessly controls the unit, is installed in the ventilation unit.

Valves, type DF-K

The valves are installed on the inside of the plenum box by means of a snap-on system. The valves are connected to the controller by means of a cable and a pluggable connector.

CO² sensor, type DF-CO2

The CO² sensor must be installed in its designated slot in the plenum box. The sensor cable is connected to the controller by means of a connector.

RH sensor, type DF-RV

Every connection to which a bathroom duct is connected (max. two) must be equipped with its own RH sensor. This RH sensor is installed in the valve's casing and connected to the controller by means of a cable and a connector.

Controller, type DF-R

The controller is installed near the DemandFlow plenum box and has an electric cable. All valves and sensors are connected to the controller.

Air Extract Grilles

The extraction vents are installed in the duct fittings. The extraction vents do not require setting.

Remote control unit, type RFT-ZEND-DF

Finally, the control unit for the air

quality settings, timer and the high efficiency cooker hood is installed. The unit has double-sided tape on the back and can be mounted directly onto the wall.

Please note:

The remote control unit must not be mounted onto a metal surface on account of the RF signal.

Accessibility of the ventilation unit

The ventilation unit and plenum must be accessible for maintenance at all times. To this end, a minimum space of 25 cm must be available at the front of the unit. In that case, the service module can still be removed from the unit, if so required.

System Activation

Once the unit is connected to the mains the system will set itself fully automatically. The engineer need not adjust the grilles to achieve or balance the air volumes because, depending on the CO² level that has been measured, the valve will auto-adjust. By pressing the IBS button, the system will go into measuring mode and in this mode, the air volumes in the wet rooms can be measured. A delivery report can be prepared using these measuring values.

System maintenance

Proper maintenance is crucial to ensure that the Itho DemandFlow system can guarantee a long term, comfortable and healthy indoor climate.

Proper maintenance ensures that:

- your living comfort remains at the desired level
- the lifespan of the system is extended
- complaints can be dealt with quickly and efficiently
- costs can be budgeted better in the long term

But what exactly is proper maintenance? At Itho, proper maintenance means:

- periodic maintenance of the various ventilation parts
- setting out agreements with regard to the correct maintenance intervals, as these differ for each component

Maintenance of the ventilation unit

In order to ensure a maximum performance in the long term, the

ventilation unit must be maintained on a regular basis. This concerns the motor/fan in the unit which must be cleaned once every five years.

Depending on the level of contamination, the frequency can differ for each installation.

Maintenance of the air extract grilles

The grilles can be easily cleaned with running hot water, under or in the dishwasher, without the need to use any abrasive detergents.

Maintenance of the Background Ventilators

The ventilators are usually equipped with mosquito gauze and must be cleaned regularly in accordance with the maintenance instructions for the ventilators in question.

Maintenance of the HR high efficiency cooker hood

The filters of the high efficiency cooker hood require regular cleaning.

Depending on the degree of contamination, this will have to be

done about once every three months. The filters can be cleaned in the dishwasher.

Ducts

As the ducts run directly from the DemandFlow plenum box to the extraction valves, maintenance of these ducts is extremely easy. The maintenance frequency depends on the contamination of the air extracted from the various rooms.

Contamination of ventilation ducts can sometimes reach critical levels, therefore regular inspection and cleaning (approx. once every four years) is a requirement. This can of course differ for each installation, depending on the level of contamination. In order to ensure fast and effective cleaning of ventilation ducts in the future, the design must take into account a number of aspects.

- the duct network system must run straight, where possible.
- In high residential houses, the termination on the roof must be easy and safe to access

Energy efficient climate control systems that add to your comfort – Itho proves that it can be done.

Wherever you are, live or work... chances are that you will be confronted with the products and services of Itho nearly every day. This is because we develop climate control systems for all those places where people are active, ranging from homes to offices and industrial units, from shops to restaurants and from sports complexes to hotels and museums.

Whenever and wherever, the residents, users and owners of all these buildings ultimately have the same two wishes: the greatest possible comfort and the lowest possible energy use.

These demands appear to be contradictory. However, here at Itho we have made it our goal to show that the two demands can be combined. We possess the professionalism, the drive and the innovative strength to actually deliver the evidence through figures, test results and particularly through satisfied and enthusiastic clients and users.



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