

# VENTS

MAGAZINE

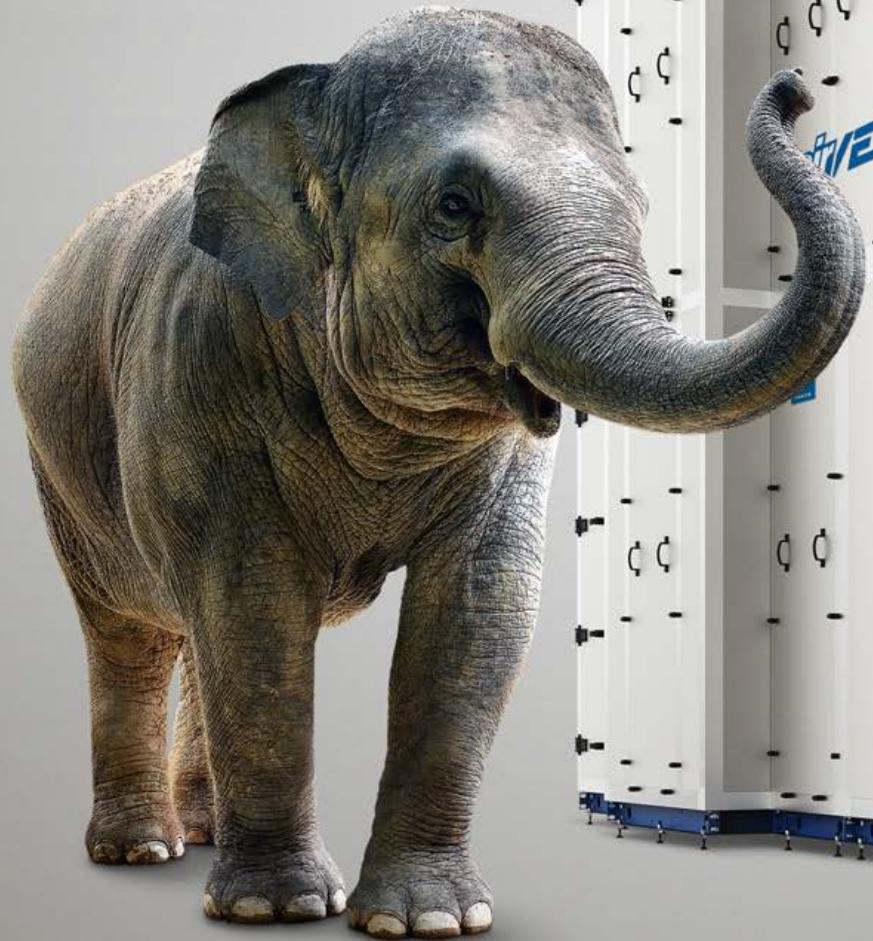
ABOUT VENTILATION AND MORE

Nº 1  
march  
2017



# VENTILATION

# A TO Z







Oleg Kolodiy

## EDITOR'S NOTE

"Air is the purest and the most subtle of the elements. It is air that human freedom is made of. Therefore the symbol of air is first and foremost the symbol of freedom". These words attributed to Friedrich Nietzsche are hard to disagree with. Perhaps there is nothing more important yet more inconspicuous than the air that surrounds us. From the first till the last day of our lives we breathe it to fill our bodies with indispensable oxygen and power our emotions with various scents of life. However, it would be unfair to reduce air to the mere aggregate of nitrogen, oxygen and CO<sub>2</sub> molecules. Depending on the season air can be heady and sensational, balmy and appeasing, hazy and velvety or crisp and prickly. And that is not to mention how special it feels in the forest, in the mountains or by the sea!

But even if we stay away from poetry and use sober scientific terms to describe air, there is still a lot to say as it can be warm or cold, dry or humid, fresh or stale, or clean or dirty. Any changes in these properties have a direct and immediate effect on human health and working capacity. More often than not this effect is quite deleterious. As the natural air may not always feel perfectly comfortable we have learned to condition it by changing its characteristics. This is where ventilation equipment comes into play.

Today ventilation is so much more than supplying fresh air and extracting stale air. Ventilation equipment enables regulating air supply depending on its quality, warming it up and cooling it down, changing its humidity, and removing dust and other contaminants from the air flow. It would not be an overstatement to say that quality ventilation makes us feel good contributing to our health and well-being.

"Ventilation Systems" ("Vents") welcomes you to the world of ventilation equipment designed and engineered to improve the quality of your life! This is the first issue of the new VENTS Magazine to keep you up to date on the VENTS product range, the company's new arrivals, energy-efficient ventilation and energy saving solutions, exciting collaboration projects and our exclusive know-how. This issue will provide an in-depth coverage of VENTS and the company's activities in 2016.

And there is so much more! The magazine articles can be accessed via the company blog available at [www.ventsworld.com](http://www.ventsworld.com).

We hope that the magazine will become a trusted source for every current or prospective ventilation market or ventilation equipment professional.

**Enjoy the VENTS Magazine! Thank you for choosing VENTS!**

# Ventilightion



## VENTS Lumis

*Axial fans with built-in  
light for exhaust ventilation  
with a capacity of up  
to 115 m<sup>3</sup>/h.*





The "VENTS" engineers deliver a unique piece of equipment commissioned to a bespoke specification



## VENTS SETS YET ANOTHER

**B**eing a renowned supplier of innovative ventilation equipment, "Ventilation Systems" has recently added the one-off AirVENTS AV65 air handling unit to its bespoke equipment portfolio. This unique extra-large air handling unit delivers a staggering performance. The AHU measures about 8 m long, 3.6 m wide and 4.3 m high fully assembled. The total weight is approximately 7,700 kg. The air supply capacity is 55.5 thousand m<sup>3</sup>/h while the air extraction capacity is 50 thousand m<sup>3</sup>/h.

The AirVENTS AV65 unit is intended for general dilution ventilation in one of Kyiv's high-rise business centres. This explains the giant size of the assembly and its unique configuration. All the unit components such as the three-circuit Freon cooler, the rotary heat exchanger, the electric heating section, the control board and others are extremely large setting a new size record for "Ventilation Systems".

According to Lavr Kotelkov, the Head of Complex Climatic Engineering and Design Solutions Department of

# FRESH AIR FOR QUALITY LEARNING

Last year "Vents" took part in a comprehensive project for reducing waste and inefficiency in central heating systems of Kyiv secondary school No. 264 (Ukraine) producing and delivering more than 100 unique pieces of energy-saving ventilation equipment. This project was aimed at creating a comfortable microclimate in the classrooms all year round and reducing the heating bills in the winter.

A few years ago the Kyiv city municipal authorities launched a comprehensive program for reducing waste and inefficiency in central heating systems to make pre-school, primary and secondary school facilities more energy efficient.

The summer of 2016 marked the commencement of work specific to boosting energy efficiency of six secondary schools in Kyiv including school No. 264. In addition to adding external heat insulation to the building walls, replacing the windows and doors, and installing more efficient lighting units the project provided for upgrading the ventilation systems to state-of-the-art energy-saving ventilation equipment by VENTS.

According to Lavr Kotelkov, the Head of Complex Climatic Engineering and Design Solutions Department of VENTS, the company engineers made a unique suite of ventilation equipment which included four AirVENTS air handling units, 98 VENTS MICRA 150 E KP single-space air handling units, VKM duct fans and a matching number of industrial ventilation accessories.

All the upgrades specific to the School No. 264 project were completed on time by the beginning of the new school year. As a result the school heating bills which used to amount UAH 1.5 million will be reduced almost two-fold. ■

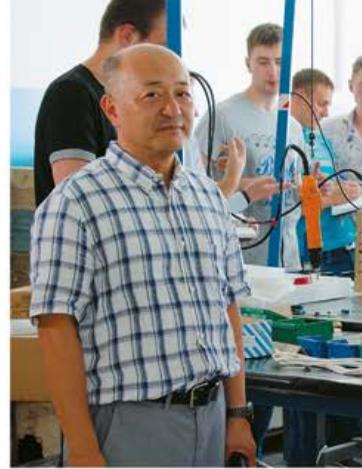


## RECORD

"Vents", building the rotary AirVENTS AV65 air handling unit marks a significant milestone in the company's history. "Besides the engineering complexity the installation demanded absolute precision, and our team delivered. It must be stressed that in Europe such work is only trusted to highly experienced engineers and specialized installation companies while we managed to assemble and install the unit only with the help of our young professionals", said Mr Kotelkov. ■



# VENTS ADOPTS TOYOTA EXPERIENCE



Standing true to its reputation of an innovation leader VENTS continues adopting lean production principles





In July 2017 "Ventilation Systems" invited Hiroshi Morivaki, a world-class consultant on lean production. Mr Morivaki inspected the production facilities and suggested a series of steps aimed at streamlining labour management and further boosting production efficiency. Today "Ventilation Systems" is a high-tech production centre making high-quality equipment compliant with some of the most stringent international standards and requirements. Such an approach has propelled VENTS to a leading position on the global ventilation system market, but the company is far from resting on its laurels.

To stay abreast of the ever-growing demand for its products and better adapt to the market needs the company is constantly exploring possibilities of improving production efficiency. Production floor expansion and technical upgrades are important, but not the only ways of reaching this goal. The best practices prove that smart labour management and elimination of waste at every production stage allows for considerable improvements in production efficiency – quickly and economically.

It was for this very reason that the company invited Hiroshi Morivaki, a leading Japanese expert in lean production with extensive consulting experience including work for Toyota and a number of other global market leaders. The visit of the Japanese consultant was timed to the upcoming launch of new floors to produce TwinFresh ventilators and single-block air handling units which the company is determined to run in line with lean production principles. However, it was not the first time for Vents to put these principles into practice. In 2015 the company launched a lean production program under the guidance of Peter Willetts, a recognized expert in business process optimization with an impressive record including a number of highly successful projects for Siemens, Bosch and Mercedes-Benz. It was at that point that the company management identified

*Lean production (also known as lean manufacturing) is a management strategy aimed at eliminating all kinds of waste within a manufacturing process. Lean production is based on involving each employee into the optimisation process and building the business around the customer. The lean production principles evolved from the Toyota Production System (TPS) and have since gained worldwide recognition.*

the priority areas for its numerous business units such as transitioning to lean production, avoiding unreasonable work which generates no value, preventing equipment malfunctions, reducing the percentage of waste etc.

Having inspected the production facilities at the factory and held a number of meetings with the staff Mr Morivaki suggested specific algorithms for streamlining production and raising its efficiency. After a talk on lean production theory the Japanese consultant gave a convincing practical demonstration of lean production advantages. In particular, Mr Morivaki modelled line mock-ups for the workers of Twin-Fresh ventilator and single-block air handling unit assembly lines which help optimise the workflow and manage each worker's time more efficiently. The experiment went to prove that creating conditions which could minimise the time from concept to finished product is absolutely possible.

Hiroshi Morivaki was impressed by the company's equipment capability and the production facility potential. In his farewell speech he stressed that the company has an excellent potential for a successful implementation of the lean production program. "Most importantly, your staff are ready to embrace the changes. I am confident that their genuine interest in innovation and their desire to transform the company are destined to make a difference", said Mr Morivaki. ■

# AIR ALERT!

**Air is never the same. In a properly ventilated space it feels fresh and clean. When the ventilation is lacking, it immediately feels foul and stale. When contaminated with pollutants it quickly turns into a health hazard. Unfortunately, the air in large cities and industrial centres often belongs to the deleterious part of the spectrum.**

**S**o how important is it to breathe clean fresh air? In 2014 the World Health Organization (WHO) published a report which stated that the number of people who died as a result of air pollution reached a staggering 7 million which accounted for every eighth death worldwide. These numbers which more than doubled the earlier estimates are just another proof of the fact that air pollution has become the most significant environmental hazard for the human health.

The WHO data points to a stronger correlation between the effects of stale air both inside spaces and in the atmosphere and cardiac diseases such as cerebral haemorrhage and coronary artery disease as well as cancerous diseases than generally believed. The effects of breathing polluted air should not be downplayed with regards to development of respiratory disease including acute respiratory infections and chronic obstructive pulmonary diseases.

### The insidious A-I-R

When it is time to air the room or office people often fall victim to the common misconception that the outside air is as fresh as the wind coming an Alpine glacier. Well, that can be true if you are fortunate enough to have the Alps in sight out of your home or office window. However, most people live in cities, large and small, making their considerable contribution into air pollution. As a result what used to be clean air becomes contaminated with dust and a host of harmful substances. In most cases these substan-

**Flavia BUSTREO,**  
WHO Assistant Director-General –  
Family, Women's and Children's  
Health



***Removing allergens and other hazardous substances from the air we breathe helps prevent non-contagious diseases and reduces the risk of many other maladies in women as well as in children and the elderly.***

ces remain below critical levels and do not pose any significant health hazard. However, as soon as you get closer to a source of pollution the situation quickly changes for the worse. Let us take a closer look at harmful substances which may be present in the air and have a deleterious effect on our health.

**Dust.** This contaminant is normally present in the air. Dust particles damage pulmonary alveoli walls penetrating the first immune barrier and opening the floodgates to infections and allergens. Dust allergy is commonly associated with such symptoms as running nose, sneezing and watery eyes.

**Carbon monoxide (CO).** Carbon monoxide inhibits oxygen transport and tissue uptake. It impairs psychomotor functions, affects cardiac function and respiratory activity, and causes headaches, drowsiness and nausea.

**Hydrogen sulphide (H<sub>2</sub>S).** Breathing this substance in low concentrations causes rapid tiredness, vertigo, anxiety and loss of smell. Higher concentrations commonly lead to dysthymia, conjunctivitis, sight disorders, vertigo, insomnia, tachycardia, cough and nausea.

**Sulphur dioxide (SO<sub>2</sub>).** This substance produces a local irritant effect on the mucous membrane of the eye and respiratory passages and is often cited to cause conjunctivitis and bronchitis. In addition



***Today coal-fired power industry is by far the biggest contributor to air pollution***



**Maria NEIRA,**  
WHO Director, Department of Public  
Health, Environmental and Social  
Determinants of Health



*Air pollution has become  
the most significant  
environmental hazard  
for the human health*

to that SO<sub>2</sub> causes a general deleterious effect on the human body.

**Nitrogen dioxide (NO<sub>2</sub>).** Nitrogen dioxide irritates the lower respiratory system – especially the lung tissue. This substance increases predisposition to acute respiratory diseases and pneumonia. Nitrogen dioxide also produces an adverse effect on the visual system organs.

**Ammonia (NH<sub>3</sub>).** Ammonia irritates the mucous membrane of the eye and respiratory passages. This substance causes severe cough while high concentrations of its vapours lead to agitation, delirium and, possibly, death.

**Formaldehyde.** Formaldehyde has pronounced mutagenic properties and acts as an intensive allergen and irritant. This substance affects the mucous membrane of the eye and might cause dermal allergy. In addition to that formaldehyde is cited as cause of mutations in the human body.

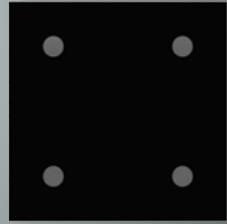
**Phenol.** Being corrosive to the respiratory tract (bronchi and lungs), phenol also

**Modern research offers convincing evidence to support the fact that risks attributed to air pollution are much more serious than previously believed – especially those connected with cardiac diseases and strokes.**

causes malignant tumours, cardiovascular and blood circulation system diseases as well as autonomic nervous system disorders.

**Benzopyrene.** This is a powerful carcinogenic agent. Its deleterious effect is further aggravated by its ability to accumulate within the human body.

**Organochlorine pesticides** Organochlorine pesticides are commonly used in agriculture often being sprayed from aircraft. Pesticides inhibit reproductive functions and increase the risk of cancerous disease development. ■



*Character  
and style*



## **VENTS Modern**

*Axial fans for exhaust  
ventilation with a flat glass  
face panel with a capacity  
of up to 310 m<sup>3</sup>/h.*





## JAF SERIES AXIAL JET FANS

**J**AF axial jet fans are intended for general ventilation of underground and semi-enclosed car parks as well as tunnel ventilation. Being essential smoke extraction system components the units provide efficient smoke extraction in the event of a fire. The fans generate a high-velocity jet to move air in the required direction and are available in temperature ratings of 200 °C/2 h, 300 °C/2 h and 400 °C/2 h.

JAF casing is made of galvanized steel with a polymer coating. A layer of mineral wool ensures noise insulation. The fan casing is provided with internal motor mounting brackets which also double as air guides. These elements ensure a uniform distribution of air stream and contribute to high aerodynamic performance of the unit.

JAF fans are driven by a three-phase asynchronous single-speed motor with a square-cage rotor. The motor is rated IP54. The motor design enables unit operation in smoke extraction systems either in a single-direction or reversible mode.

FRESH  
AIR FOR  
COVERED  
CAR PARKS



## ICF SERIES CENTRIFUGAL PULSE FANS

ICF fans are intended for general ventilation of underground and semi-enclosed car parks. Just like JAF fans these units are capable of ensuring efficient smoke extraction in the event of a fire.

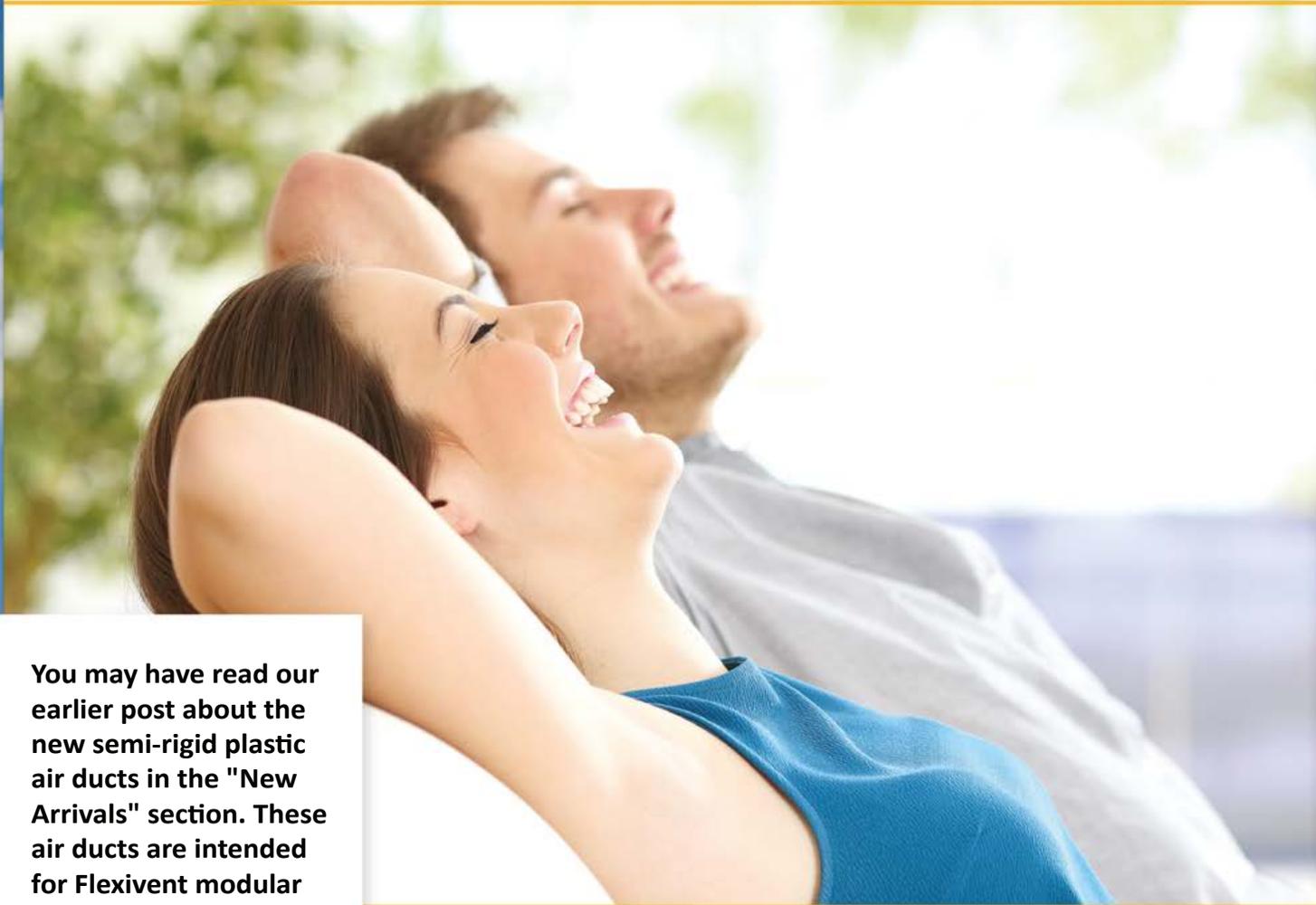
The ICF fan casing is made of polymer-coated steel. A slim vertical profile of the unit makes it perfectly suitable for spaces with low ceilings. The fan intake is protected with a grille to prevent penetration of foreign objects. The fan outlet has a diffuser which ensures proper air stream distribution. ICF fans are equipped with single-speed or double-speed 4-pole, 6-pole, and 8-pole asynchronous electric motors which are rated IP55.

The fans are suspended under the ceiling using special mounting brackets. The power is supplied via an internal terminal box. Electrical connection and installation must be performed in accordance with the instruction manual and the electrical connections diagram provided inside the terminal box.

# FLEXIVENT: A JOB OF ONE-TWO-THREE



Flexivent modular heat recovery ventilation system features



You may have read our earlier post about the new semi-rigid plastic air ducts in the "New Arrivals" section. These air ducts are intended for Flexivent modular air distribution systems and offer a number of significant advantages over more conventional designs.

**S**emi-rigid ducts are used in supply and exhaust ventilation systems of residential buildings – first and foremost in new blocks of flats and houses as well as in their renovation. Such solutions provide time and cost savings due to a simpler and faster installation compared to the conventional ventilation systems with rigid air ducts.

## The solution from VENTS

"VENTILATION SYSTEMS" has recently launched production of 63 mm and 75 mm round air ducts – the integral components of Flexivent modular air distribution system. These new products are intended for heat-recovery forced ventilation systems.

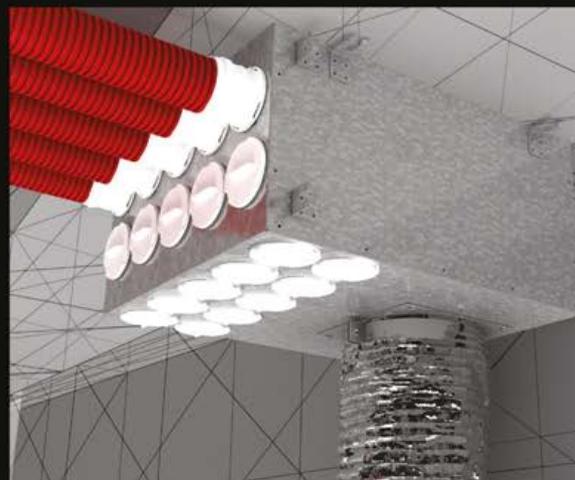


Flexivent systems provide fresh air supply as well as its cleaning and transportation. In addition to that the systems are used for extracting stale air and transferring its heat to the supply air stream. Flexivent system was designed to ensure proper distribution of ventilation air among the serviced spaces by installing headers between the ventilation unit and the air grilles for supplying fresh air and extracting stale air. The supply grilles provide fresh air supply to bedrooms and living rooms whereas stale air is extracted via extract grilles from the kitchen, bathrooms and other domestic spaces.

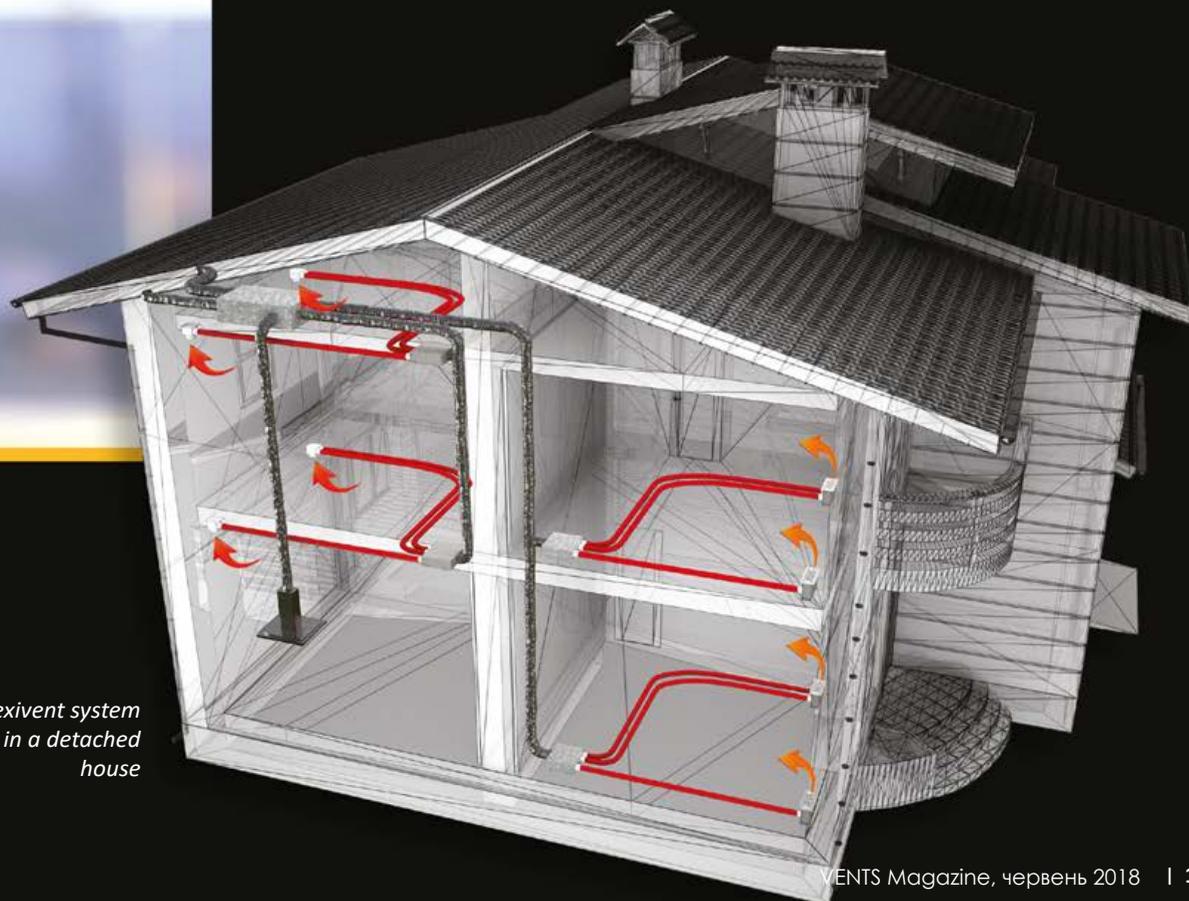
### Features and advantages

Thanks to the flexible ducts and multifunctional fittings and connectors Flexivent system makes ventilation system installation simple and quick.

No special tools are required as air ducts can be trimmed to any length with a common utility knife.

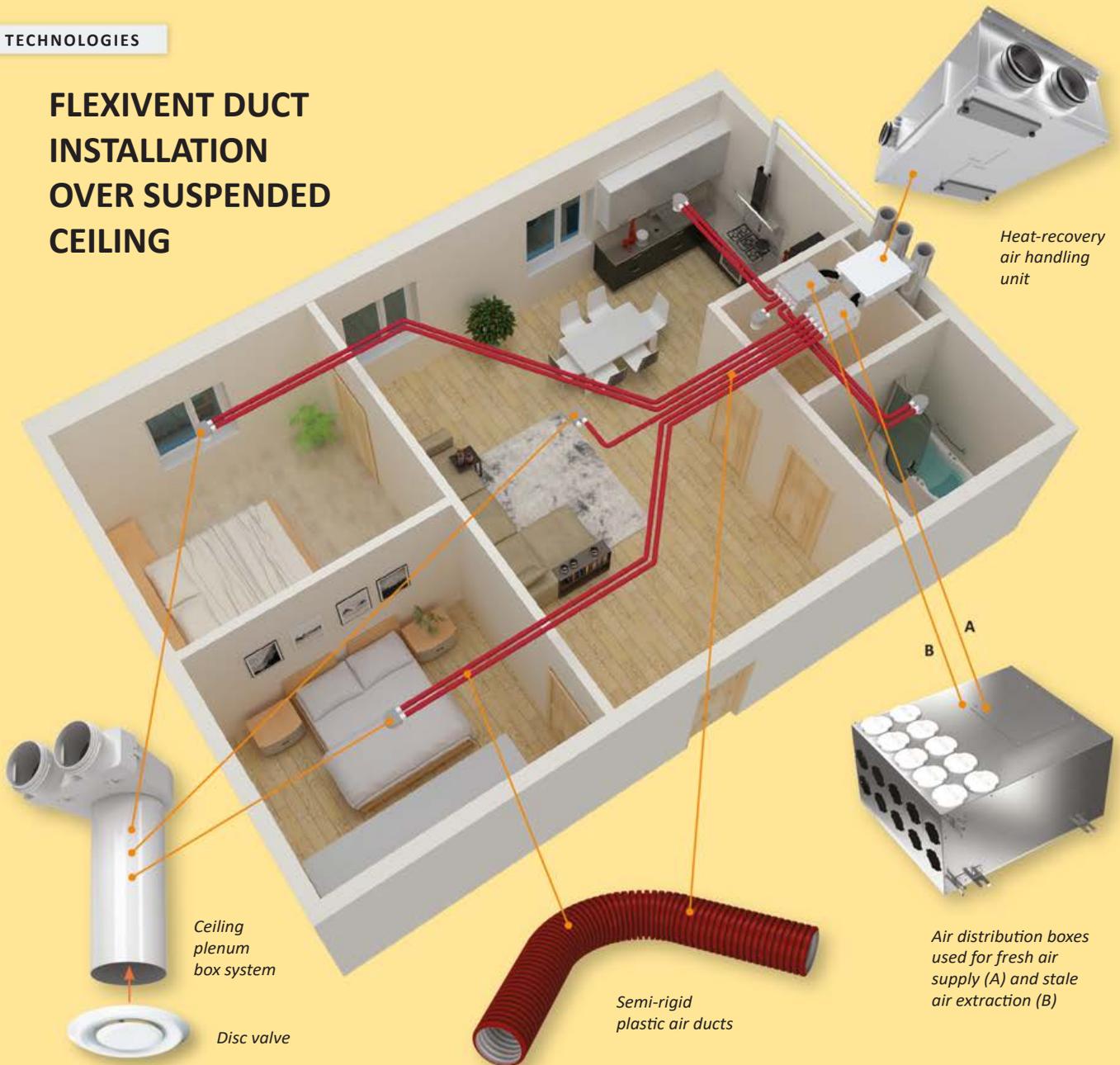


As was stated before, the material and shape of the semi-rigid air ducts allow for concrete overlay enabling nestling them into the floor structure. A smooth inner surface of the air ducts results in a significant reduction of air resistance and facilitates cleaning. Moreover, the use of rubber seals, fittings and connectors helps make the ducts virtually air-tight preventing potential air leaks.

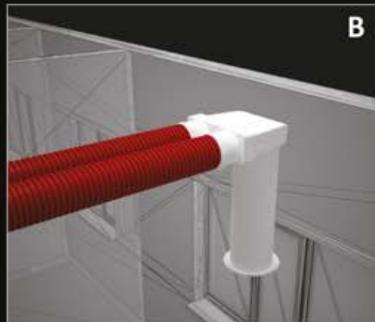
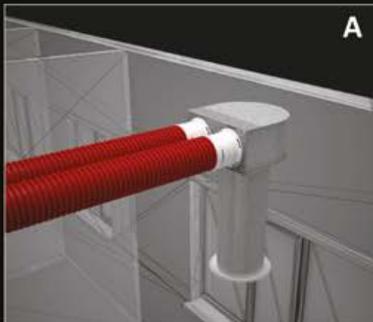


*Flexivent system  
in a detached  
house*

## FLEXIVENT DUCT INSTALLATION OVER SUSPENDED CEILING



### DUCT INSTALLATION OVER SUSPENDED CEILING USING METAL (A) AND PLASTIC (B) PLENUM BOXES



### System installation

To build a forced ventilation system with heat recovery in a residential space using Flexivent system you will need to install the following elements:

- External grilles to be used for fresh air supply and stale air extraction.
- Heat-insulated main ducts.
- Ventilation unit with heat exchanger.
- Headers to distribute supply air among the rooms and provide connection of Flexivent extract ducts to the extract main duct.
- Semi-rigid Flexivent ducts for air transportation.

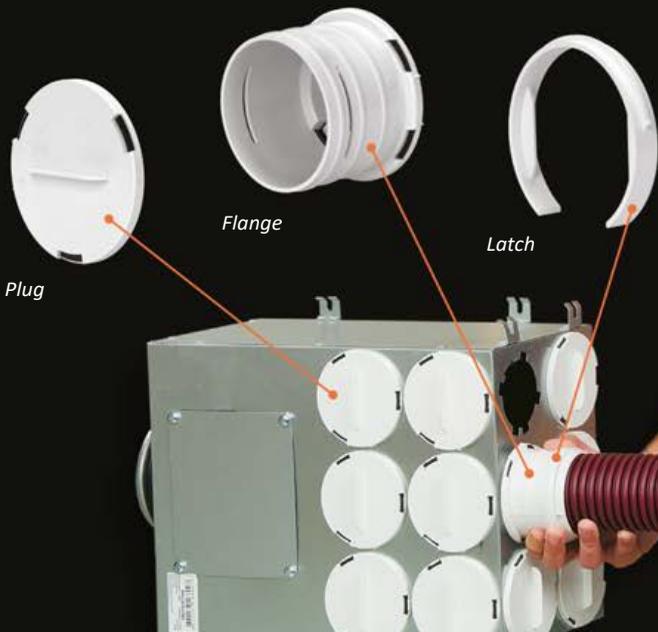
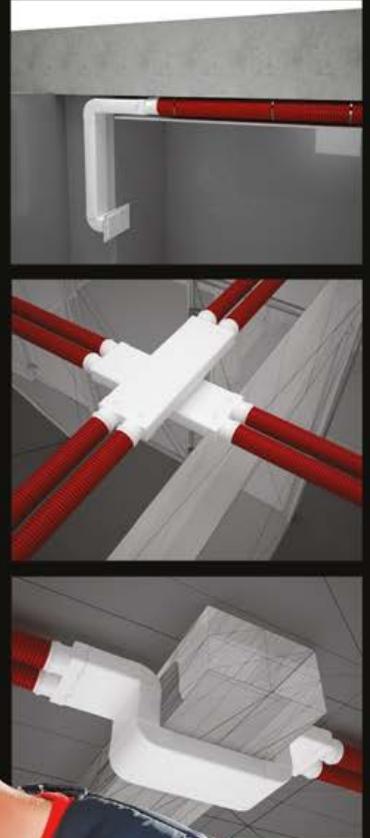
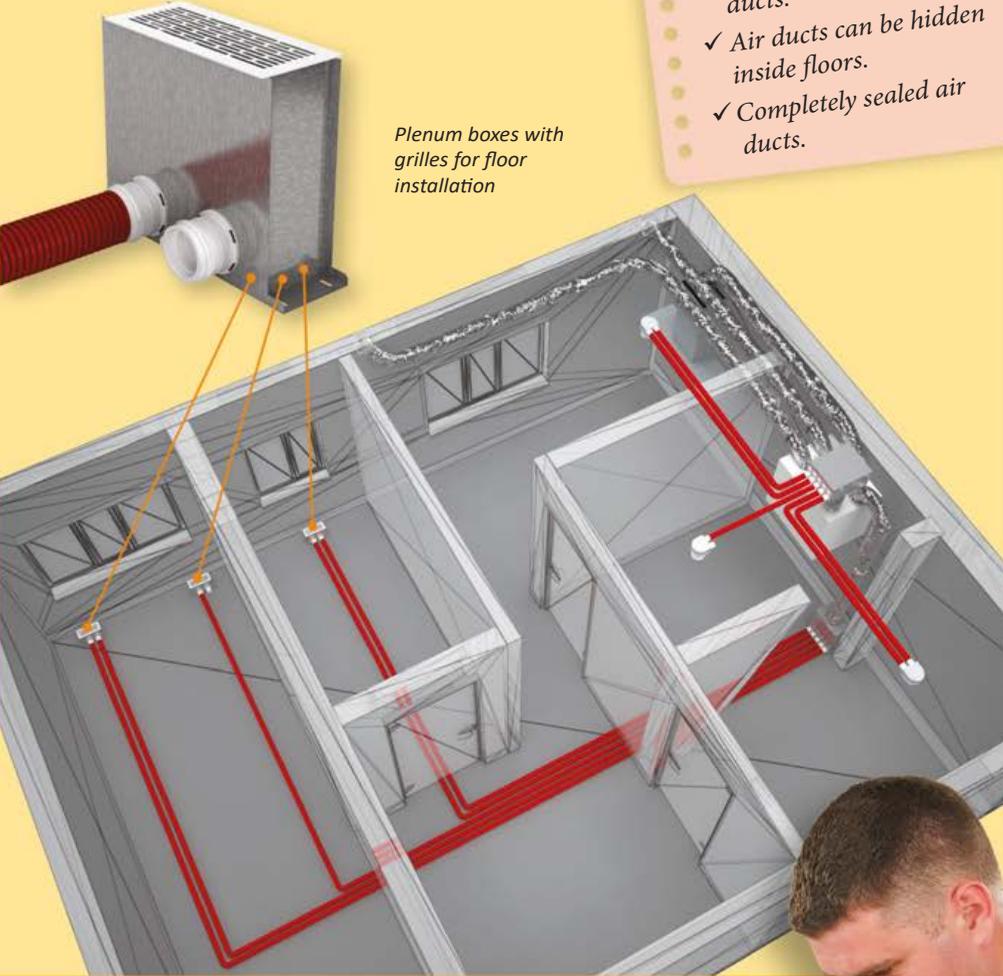
# DUCT INSTALLATION IN THE FLOOR (SUPPLY AIR) AND OVER SUSPENDED CEILING (EXTRACT AIR)

## Flexivent system advantages:

- ✓ Quick and easy installation.
- ✓ No special tools required.
- ✓ Flexible and sturdy air ducts.
- ✓ Air ducts can be hidden inside floors.
- ✓ Completely sealed air ducts.

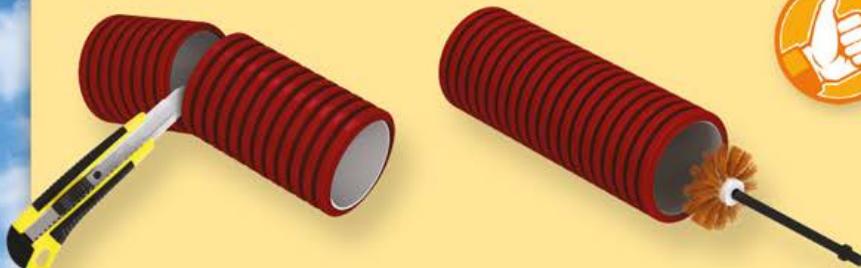
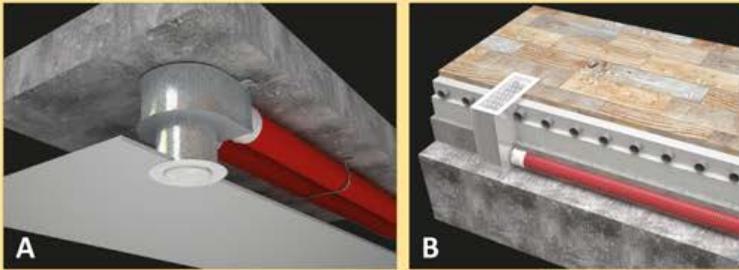
Plenum boxes with grilles for floor installation

## USES OF PLASTIVENT FLAT FOLDING PVC DUCTS IN FLEXIVENT SYSTEMS



**STURDY**

## FLEXIVENT SEMI-RIGID DUCT INSTALLATION OVER SUSPENDED CEILING (A) AND IN THE FLOOR (B)



*Flexivent semi-rigid air ducts can be trimmed with a common utility knife and cleaned with a brush*



- Grilled connectors for supply air distribution and extract air intake. The air is transported via semi-rigid air ducts. Depending on the required capacity one, two or more air ducts are routed into each room. The headers ensure air distribution among the rooms.

The number of header branch pipes depends on the number of rooms whereas its shape is defined by the installation method. The number of semi-rigid air ducts connected to a header may vary. The fit is ensured by inserting round or oval flanges into the header ports. The air ducts latched into the flanges for a secure fit whereas any unused ports are closed with matching plugs. To avoid potential air leakages all the elements are provided with rubber seals.

The semi-rigid air ducts are terminated with plenum boxes with grilles. Depending on the required capacity one plenum box can take one or two air duct connections. Any unused ports are closed with matching plugs. The air ducts and plugs are latched in place. These elements are also provided with rubber seals to avoid air leaks. ■



*Freshness  
without  
limits*

**VENTS VUT 350  
VB EC A11**

*Heat and moisture recovery  
air handling units*



[www.ventilation-system.com](http://www.ventilation-system.com)

# 10 NEGATIVE EFFECTS OF INADEQUATE VENTILATION IN A RESIDENTIAL BUILDING AND OFFICE



1

## TOO MUCH CARBON DIOXIDE AND TOO LITTLE OXYGEN

Insufficient fresh air supply leads to increased concentrations of carbon dioxide released through respiration. This causes people to feel unwell and experience headaches, productivity loss and exacerbates chronic diseases.

## DUST-POLLUTED SPACES

Any space with poor ventilation is quickly covered with dust which penetrates the respiratory system and paves way for various infections and allergens. Dust allergy is commonly associated with such symptoms as running nose, sneezing and watery eyes.

2



3

## DRYING FURNITURE AND FLOORBOARDS

Furniture and floorboards are commonly made of wood and sawn wood products. Elevated humidity which is often observed in poorly ventilated spaces causes such units to change size, bloat, warp and crumble.

## EXCESS MOISTURE, MOULD AND BACTERIA

Poor ventilation leads to excess moisture which manifests itself with condensation on windows and walls. Not only does excess moisture impair finish and construction materials – it also stimulates the development of harmful mould and bacteria.



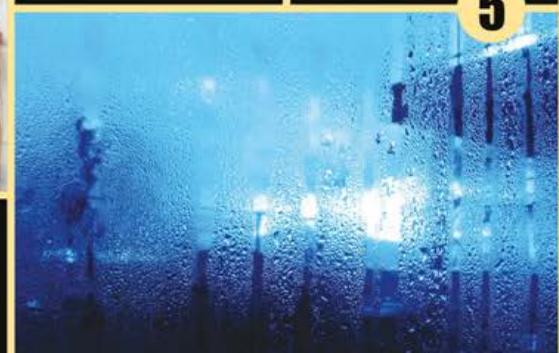
## STALE ODOURS

Stale air often reeks with a concoction of smells coming from food products, furniture, household detergents, pets and other things you normally would not notice. Such cacophony is hardly pleasing for the human nose.

4



5



### NOXIOUS VAPOURS

The odours which may accumulate in poorly ventilated spaces can be accompanied by noxious vapours coming from paint, lacquers, furniture, construction materials and other sources. Such odours can be a direct hazard for human health.

6



### NOXIOUS CARBON MONOXIDE

Furnace heating, solid-fired boilers, fireplaces, gas-fired boilers and stoves are potential sources of noxious carbon monoxide. Elevated concentrations of carbon monoxide in poorly ventilated spaces cause headaches, tiredness and dizziness. High CO concentrations may be lethal.

7



### INCREASED AIR TEMPERATURE

Insufficient ventilation causes indoor temperature to gradually increase due to the extra heat released by the inhabitants, operating stoves and various electrical appliances. Temperatures above 23°C result in human discomfort and may adversely affect their physical and mental activity.

8



### LOW RELATIVE HUMIDITY DURING HEATING SEASON

In the cold season heating radiators increase indoor temperature thereby reducing relative humidity. High air temperatures in heated spaces cause skin dryness, drowsiness and tiredness. This also causes the leaves of house and office plants to dry and wither.

9



### HEALTH IMPAIRMENT

Practically all the aforesaid consequences of poor ventilation in homes, flats and offices contribute to the impairment of health of their inhabitants. This is the most important adverse factor out of the above.

10





**Actually, It is nothing short of vital. A human can go for more than four weeks without food, for a few days without water, but only for a few minutes without air. While we can suppress our hunger and thirst waiting for a meal or a drink, we just cannot function without regular breathing. Air gives life, but fresh air adds quality to it.**

So how important is it to breathe clean fresh air?

## FRESH AIR TO STAY STRONG

**N**ot so long, just a few thousand years ago most of our ancestors used to live in well-ventilated caves and huts, wore light and open clothes and spent most of their lives foraging, farming and hunting outdoors. Living in a blissful ignorance about oxygen concentrations and negatively charged ions they still enjoyed breathing fresh air, spent plenty of time outdoors

and stayed healthy and strong. Unlike the forefathers the people of today are well aware of all the benefits of fresh air, but still prefer to stay behind thick walls, double-glazed windows and multiple layers of clothes. In addition to that most of our fellow countrymen live in polluted cities where the need for physical exercise is reduced to a bare minimum. This results in a deteriora-

tion of bodily well-being and physical weakness, high sensitivity to even most subtle environmental changes, low immunity, poor stamina and premature ageing. Does that sound familiar? Well, you can make them all go away!

### More oxygen for the masses

In everyday language the word "fresh" as in "fresh air" normally alludes to the oxygen it contains. Amounting to more than 65% of weight, this gas is the most important element in the human body. Oxygen enables normal functions as it is this element that provides the main source of energy for the metabolism. Oxygen is also contained in proteins, vitamins, hormones, fats, carbohydrates, ferments and other biologically important substances. In other words, the health of all the body system entirely depends on oxygen intake.



*If you want to prevent cardiovascular diseases, remember to do some simple exercise while taking a walk*

Oxygen is particularly important for the brain which consumes about 25% of the gas entering the blood flow. However, oxygen is of equal importance for the cardiovascular and nervous systems. This gas ensures normal functions of our internal organs and sustains metabolic processes. Oxygen provides the immune system with the power to function properly fighting viruses and other hostile microorganisms. Scientists claim that the minimum oxygen demand for an adult body is 250

ml per minute or 15 l per hour. However, it should be stressed that the more oxygen you get with the air you breathe the better you feel. Sufficient blood oxygenation translates into the feeling of energy, strength and health. Consequently, a lack of oxygen slows down oxidation processes in the body, causes metabolic disorders, and impairs physical and mental activity. This weakens the body's natural defences making it vulnerable to various diseases.

### The stuffy bubble

Oxygen is the most common element on our planet. It is an essential building block of many organic substances and is present in all living cells. Oxygen accounts for 25% of atoms in the living cells or about 65% of their weight. From what we know oxygen does not seem to be in short supply – there is more than enough to keep every human being in perfect health. Yet, most of the time people do not get enough. How so? There are two main reasons for the lack of oxygen in the human body: the environmental factor and the human factor. Let us give each one of them a closer look.

**The environmental factor.** The Earth atmosphere is a balanced system which consists of a certain mixture of gases whose quantitative content remains near constant. The volume concentration of oxygen in the atmosphere is 20.95 % and it remains the same no matter what. Looks like there is nothing to worry about. Or is there? Changes in weather conditions may result in a significant reduction of the absolute content of oxygen in the same volume of air that people breathe. For example, a drop in barometric pressure or a certain change of temperature and humidity may cause a significant drop of the oxygen content in the ambient air. A drop in oxygen intake may impair the general state of health of people with cardiac, vascular and lung diseases. You probably know some people who always complain about headaches associated with upcoming weather changes, don't you? Actually, their fingers are pointed in the right direction. Not only do pressure drops lead to active



*Walks in the open air are a good idea for people of any age any time of the day – and in any weather*

*A lack of oxygen slows down oxidation processes in the body, causes metabolic disorders, and impairs physical and mental activity*

circulation in the atmosphere – they also result in a reduction of oxygen content in the air which, in turn, makes our brain and our whole body react accordingly.

**The human factor.** This is the major factor for oxygen deficiency mainly due to the fact that people are too lazy or reluctant to live a healthy lifestyle. Most often it is people themselves who do everything they can not to get enough fresh air and oxygen. Instead of going for regular walks and spending time in the country lots of people prefer closed spaces with stuffy air for spending their free time. Instead of doing sports or morning exercise they treat their backs to sofas and couches. Instead of getting proper ventilation to ensure ample

supply of fresh air they install air-tight glass units and turn their homes into stuffy dens. And last, but not least, they choose thick synthetic garments over simpler clothes made with natural breathable materials. All these choices weaken the body's defences. Another aspect of the human factor which contributes to low oxygenation is low hemoglobin in people with anaemia, hypodynamia caused by sedentary lifestyle, stress, smoking, and use of alcohol.

### **Breathe deeply!**

What can you do stay young and strong for as long as possible and live to the max? The answer is quite obvious: let the body get what it needs to function properly. And more than everything else your body needs fresh air, clean water, healthy food and exercise – not pharmaceuticals as some adverts may claim. Go ahead and savour every breath of fresh air! You may come to enjoy escaping the city and wandering into the countryside, going a walk or a jog in the park or simply staying outdoors or sleeping in a well-aired room. If going to the country every weekend is not an option, try to make a habit of going for a stroll in the nearest park in

### **NUMBERS AND FACTS**

- The volume part of oxygen in the atmosphere is almost 21 %.
- 90 % of oxygen is received through the respiratory system.
- The volume part of oxygen in the human body is 65 %.
- The body of an adult requires at least 250 ml of oxygen per minute.
- The total amount of oxygen stored in the body is about 1.5 l.
- The brain consumes 25 % of the oxygen supply to the body.

*Cycling is another great way of keeping fit*



the morning or in the evening. These activities should last for at least 30 minutes. Spending time in the open is a great way of stimulating oxygenation and keeping your cardiovascular system in check, but you might also consider doing some simple exercise. This can be jogging or even a brisk walk.

Combining walking with breathing exercises is an excellent way of preventing respiratory diseases. For example, take three breaths through the left nostril and then – three breaths through the right one. Then inhale through the mouth and hold your breath until you want to exhale. Exhale and then take a few strong breaths through the nose. Repeat this exercise from time to time and it will help exercise and strengthen the lung muscles. Walks in the open air are a good idea for people of any age any time of the day – in any weather. Make sure to wear appropriate clothes and footwear for the weather and the season so as not to break a sweat or get cold. For example, a pair of trainers and a hooded weatherproof jacket would be perfect in the autumn. Fancy a walk in the winter? Just don't forget to put on a pair of warm boots, a jumper, a woolen hat and some gloves.

Fresh air will not do you much good if you sleep in a room with all windows and doors tightly shut. For some real

anti-ageing effect and health improvement – and some nice dreams as a bonus – make sure to leave the vent panes open before you go to bed. If this sounds too radical, try doing it little by little. To begin with start airing your bedroom for 10 minutes before hitting the pillow. Once your body gets used to the coolness, you can try leaving the vent pane and then the whole window open all night long. When first exposing yourself to cool fresh air you may want to get under a duvet and then switch to a thinner blanket. In the summer you might consider putting the blanket away and sleeping in pyjamas.

However, letting in fresh air through a vent pane or a window has some disadvantages too. Be prepared to deal with dust and street noise. In addition to that the supply air may be very cold in the winter (or very hot in the summer) which will not go unnoticed when the heating or air conditioning bills come. **As an alternative for opening vent panes or windows you may also consider installing a wall-mounted ventilator with a built-in heat energy recuperator.** This solution will let you enjoy clean fresh air all day long and reduce the heating and air conditioning costs.

And the final piece of advice: breath deeply and stay healthy and strong! ■

## Here are 5 tips for the lazy bones

**who struggle for a good reason to enjoy a walk in the open**

- 1 FIND SOME COMPANY**  
Walking outside becomes much more meaningful and enjoyable if you are with a friend or two.
- 2 GET A DOG**  
When it is time to go, you go – rain or shine.
- 3 TAKE UP PHOTOGRAPHY**  
Getting outside can drive your inspiration in a million ways.
- 4 BUY OR HIRE A BICYCLE**  
Although you will not have to actually walk, this activity will give you a lot of cardio-aerobic exercise.
- 5 FIND WIFI SPOTS IN A PARK OR JUST OUTSIDE ONE**  
This way you will enjoy fresh air while letting the world know how good you are feeling.





Ventilation has become an indispensable element of every modern house, flat or office. And still when the air gets stuffy lots of people hurry to open vent panes and windows to get a lungful of freshness. However, most people do not realise that enjoying such freshness during the heating season may take the monthly bill a long way north. Is there a way to avert such costs?

### Single-room heat recovery ventilation systems

# DUST, NOISE AND COST-EFFECTIVE

**T**winFresh single-room reversible ventilators are one of the most efficient solutions to this problem. Such ventilators (also known as supply dampers) provide continuous supply of fresh air free from dust and extraction of stale air from the spaces while the built-in energy recuperators will result in much more affordable air conditioning bills in the summer and heating bills in the winter.

What does it have to do with heating? It turns out that ventilation has a direct effect on indoor temperature conditions. In the winter heating appliances warm up the air until creating an optimum microclimate, but this warmed-up air is then duly extracted by the ventilation system. The sad truth is that the better the ventilation system works, the more heat it extracts from the serviced spaces. The same happens in the sum-

## TWINFRESH VENTILATOR INSTALLATION

(as represented by the Standard series)



*Installation into a wall of standard thickness using the EN hood*



*Installation into a thin wall using the EN-2 hood*



*Installation at an angle using the NP 60x204-0021 kit*

mer time except this time it is the cool air that goes outside. In other words the money spent on heating or air conditioning is literally thrown to the winds. At the current energy prices this waste may cost a pretty penny. How much energy is wasted exactly? That is a good question. Every building has air leaks causing inevitable heat losses. Statistically the principal heat losses occur through the foundation (up to 15%), exterior walls (up to 15%), windows and doors (up to 17%), roofing system (up to 10%) and ventilation system (up to 50%). As you can see, ventilation may account for up to a half of the generated heat losses. No matter how well you insulate the exterior walls, roofing and foundation, no matter how good the sealed insulated glass units in windows and doors are, this is only a partial solution to the problem. How do you address the remaining part? Paying for the vented heat just does not make any sense.

However, there is a solution. How about a device that does not require shutting off or restricting the existing ventilation? Sounds too good to be true? A TwinFresh ventilator will let you enjoy fresh air while ensuring maximum heat savings.

TwinFresh ventilators are compact and completely assembled ventilation devices which help ensure a consistent supply of fresh air and stale air extraction. Besides being efficient, versatile and economical these units are very easy to install and service. Such supply dampers can be used both as auxiliary ventilation equipment (to compensate for inadequate ventilation) or as primary units.

The units are installed directly into the external wall – most often above a heating radiator to reduce the time required to warm up the cool supply air in the cold season.

A TwinFresh supply damper consists of a telescopic duct, a fan /chassis assembly and an outdoor vent hood. The telescopic duct houses the filters and a high-tech ceramic energy capacitor which regenerates up to 90% of air heat. This energy capacitor helps recycle the heat energy contained in the extract air to warm up the supply air stream. If you hate the idea of literally



*The main advantage of VENTS TwinFresh is being able to supply purified heated air at minimum energy consumption*



*TwinFresh ventilators have three operating modes: air supply, air extraction and alternating reverse mode with intermittent supply and extraction cycles*

throwing your money to the wind and would like to save on heating in the winter and air conditioning in the summer, you will not be disappointed. The unique honeycomb structure of the ceramic energy capacitor provides an ample air contact surface and ensures outstanding thermal conductivity and energy accumulation. The capacitor also features special antibacterial treatment preventing bacterial growth inside the regenerator unit. The telescopic duct can be round or square in section to ensure convenient mounting while erecting the building.

Square-section telescopic ducts are made of metal with a polymer coating and a layer of insulation material whereas their round counterparts are made of PVC.

The duct length can be adjusted according to the wall thickness to speed up installation.

Air supply and extraction is ensured by means of a reversible axial fan with an EC motor. The EC technology ensures low power consumption. The fan takes 12 V power for electrical safety. The supply damper can be operated in one of the three modes: air supply, air extraction and alternating reverse mode with intermittent supply and extraction cycles. The desired mode is set on the external panel of the unit.

The supply and extract air is purified by two built-in filters (G3 class combined). The filters are efficient against dust and insects protecting the internal ventilator components from contamination. The filters also have antibacterial treatment. To clean the filters just use a vacuum cleaner or rinse them with water which does not impair their antibacterial properties. ■

### **TwinFresh ventilator advantages**

- Clean fresh air supply.
- Ventilation without significant heat losses: the energy capacitor used in the supply damper recycles up to 90% of the extract air heat.
- Silent operation (14–41 dBA).
- Utilises a reversible low-power EC fan (2.8–4.8 W) with safe 12 V power voltage.
- Three circulation modes (air supply, air extraction and alternating reverse mode).



*Comfort  
expert*

**VENTS**  
**TwinFresh Expert**

*Energy recovery  
single-room ventilators with  
WiFi control*





## HARNESSING SUNLIGHT FOR COOKING

**T**he SolSource cooker with parabolic reflective mirrors sold by One Earth Designs utilises solar energy for cooking. This elegant device lets you grill, pan fry, sauté, steam, boil, deep fry and slow-cook in the open. According to the developers, SolSource transforms 80% of the sunlight hitting its surface into thermal energy producing the necessary heat. The solar reflector is engineered to

achieve the perfect curvature for capturing sun light and delivering intense heat to the platform which accommodates a wide range of cookware. The solar reflector remain cool while you cook, but you will still need oven gloves for handling hot cookware. On a sunny day SolSource cooker can boil a litre of water within 10 minutes while in only takes 5 minutes to achieve the temperature required for frying or baking. ■



# LED LAMP FOR HOUSEHOLD MAGIC

**P**hilips has recently launched an innovative LED lamp with several operation modes and the ability to change hue and brightness depending on the owner's preferences – and that is not to mention its ultra-low electricity consumption. The light can be conveniently controlled remotely from a smartphone: just program the bulb to turn on and off at specific intervals and it can wake you up in the morning instead of an alarm clock, provide cooking-related

indication or help in all sorts of other activities. The light can also give a discreet signal about a new e-mail or text on

your smartphone. In addition to that the lamp has a special eye-friendly mode for reading or relaxing. ■



## ELECTRICITY CONSUMPTION UNDER CONTROL

**A**merican company TED introduced a new residential electricity monitoring system which, according to the developers, can save 5 to 30 % of energy resources. The TED monitoring system displays the current electricity consumption and its cost in real time, the active consumers and lots of other useful data. The data can be viewed on any mobile device (iOS or Android) which can be used to control consumption either manually or by programming the system to take action automatically. Now you have got the power under control! ■



# ELECTRICITY THRIFTBOX

www.technotherm.prom.ua

**W**ith a multirate electricity metering system in place static or dynamic heat capacitors become one of the most efficient and economic means of cutting energy costs.

A heat capacitor is an electric heating device which accumulates heat provided at a lower rate during the night hours. Having accumulated the necessary

amount of heat energy the device then discharges it during the day maintaining a comfortable level of heat in the room. A dynamic heat capacitor discharges heat using a built-in fan whereas the operation of a static heat capacitor is based on free convection of heat. The savings from using the device result from the difference in the electricity rate during the day and the night.

The heater casing is made of steel sheets with a heat-resistant lacquer coating. The casing contains magnesite blocks housing the heating elements. During the night the elements accumulate heat and provide its lossless storage. When the heat accumulation process is complete, the temperature inside the device reaches 750 °C although the casing surface never heats up over 60 °C.

## HEAT-SAVING VENTILATION

**V**entilation has become an indispensable element of every modern home. However, it is ventilation that accounts for removing up to 50 % of heat in the cold season causing the heating bills to grow out of control. Considering the current electricity and other energy prices these costs can be quite significant.

"Ventilation Systems" has come up with a number of efficient solutions to ensure quality ventilation while maintaining maximum energy efficiency. The VENTS VUT series of air handling units are equipped with special heat exchangers capable of recycling up to 98 % of heat otherwise lost to warm up the serviced spaces.

The VUT series units feature high-efficiency electronically commutated (EC) motors with external rotor and backward curved blades which further contribute to energy savings. Today such motors provide the best in energy savings due to their excellent efficiency of up to 90 %. ■



# ECONOMY MEETS AESTHETICS

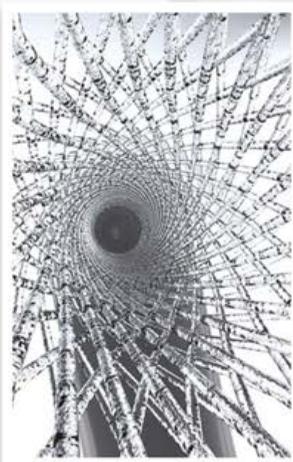
**S**aving water is also an extremely important factor in saving energy - especially if the water requires heating.

The London-based designer Simin Qiu created a unique faucet which combines stunning looks with outstanding savings - up to 15 % of the water used compared to a regular faucet.

Special "Swirl" nozzles help reduce water consumption at the same delivery pressure. Qiu's design incorporates a double turbine activated by the natural vortex motion of water under the influence of gravity which produces a multitude of water jets at various angles for an intricate pattern.

This is combined with holes cut into the nozzle of the faucet to create patterns in the water flow, with three different designs creating three different water effects.

Rather than a tap that needs to be turned, or a lever, the faucet has a one-touch button to control water flow. Economical and beautiful! ■



www.demilked.com

# ENERGY VAMPIRE SLAYER

**T**he modern home can hardly exist without electricity and electrical appliances. The crave for comfort drives people to bring more and more devices into their homes straining the power grid. Everything comes at a price - this is beyond question. However, how many people realise that their TVs, printers, microwave ovens and DVD players still spin your meters even while on standby turning into silent energy vampires? If you feel

that satisfying their voracious appetite is a complete waste of money, you need is a smart switching extension cord.

Unlike conventional extension cords this unit stops your appliances which remain on standby from sucking energy from the power grid. Although its function is fairly simple, this smart gadget can actually achieve considerable savings. Just think for yourself: the power drained by electrical appliances on standby may account for

up to 10 % of the entire energy consumption by a household. This electrical energy wasted is equivalent to 1 % of the world's CO<sub>2</sub> emissions.

Of course, you can simply unplug your appliances after using them to prevent their transformation into energy vampires. But why not just let the smart switching extension cord do this job while you can focus on something enjoyable? ■



YOU HAVE QUESTIONS –  
WE HAVE ANSWERS!

## What are the main characteristics used in fan selection?

The two main characteristics which define fan operation are its air capacity (i.e. the amount of air transported by the fan during in unit time) and the pressure it develops. These characteristics are used for selecting and comparing fans.

The power output and maximum speed of the motor are of secondary importance and are by no means sufficient for making a selection decision.

Fans should not be compared by maximum air capacity. The differences in performance diagrams may stem from fan design. Instead we recommend choosing characteristic operating points corresponding to a specific relation of performance and developed pressure and using them for comparison.

## Where should I have the ventilation equipment installed?

It all depends on what kind of equipment it is and what duties it is to perform. As a rule, the main assemblies are placed in plant rooms in the semi-basement or in the attic. Subceiling mounting can also be an option. However, just as any other equipment containing moving parts ventilation units require regular service maintenance and cleaning.

## How do I properly complete the electrical connections of my ventilation equipment?

Before proceeding with electrical installation works make sure that the persons selected for the job are properly qualified. It should also be noted that in many cases the information (electrical connection diagrams) supplied with specific components of ventila-

tion systems may not be enough to make the necessary provisions. For example, the information contained in the technical certificates of a heater, heating controller and fan regulator would not be enough to complete the electrical connections on assembled supply units with electric heating. Normal operation of such a system would require connecting these components via an electromagnetic relay or a dedicated automatic switchboard. Make sure to obtain the entire information about the electrical connections of the equipment from your suppliers. It is also advisable to become familiar with the typical patterns used for electrical connections of ventilation equipment.

## Do fan motors require thermal protection?

The motors of most modern fans should be provided with adequate thermal protection to ensure their normal operation. As a rule, the means of thermal protection are not supplied with the fan and must be purchased separately. Design contractors often overlook thermal protection while drafting specifications, but this matter should be given proper attention. Otherwise you may have a situation when your equipment failure is not covered by the manufacturer's warranty. Small-capacity round duct fans are an exception to this rule as they feature built-in thermal protection of the motor - straight from the factory. Therefore, their motors do not require any additional protection. Thermal protection means may include transformers which are used for regulating fan performance.

The complete information regarding the electric motors and their need of thermal protection can be found in the equipment manufacturers' catalogues.

## How long is a warranty on ventilation equipment?

Reputable companies provide at least 18 months of warranty coverage for their equipment. A shorter warranty period should raise a red flag. It may be indicative of poor equipment quality which might otherwise cause too many returns for the manufacturer. At the same time very long warranty periods should also be taken with a pinch of salt. It is best to ask the seller all kinds of questions regarding the warranty support and faulty component replacement procedures before making the decision.

## How long does it take to complete a relatively small ventilation equipment installation project?

Such estimates are extremely case-specific. The average time for completing a medium-size projects involving a team of 2 to 4 people is normally 4 to 7 working days. However, the work is carried out on a phased basis. The completion of work specific to ventilation equipment installation is highly dependent on the degree of building readiness and the possibility of carrying out the scheduled scope of work. Other interior finish works are much more likely to cause delays than the works specific to climatic system installation.

## In what cases do air ducts require thermal insulation?

The air path in supply systems – from the air intake to the heating elements – must be provided with thermal insulation. This prevents air condensation inside the air duct.

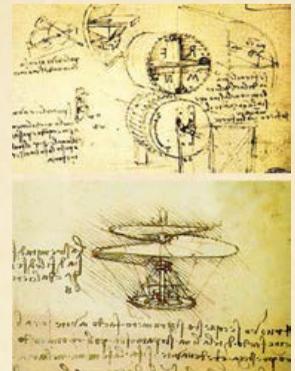
Air ducts used for transporting relatively warm air which pass through spaces with low temperatures must be insulated to prevent moisture condensation inside the ducts as well as heat losses. ■

# VENTILATION HISTORY IN BRIEF

1480-1490

It is believed that it was Leonardo da Vinci who first came up with the idea of a device to compress and transport air. The drawing sketched by the great Italian which still survived till the present day provides a fairly detailed representation of its operating principle. The device is a cylindrical drum split into interconnected sections filled with water. As the drum rotates the water flows from section to section compressing the air and pushing it along the pipe in the central area of the unit (see above).

The Italian genius also invented the aerial screw which was intended to compress air generating lift for his vertical-takeoff rotorcraft (see below). Today this invention is known as "Leonardo da Vinci's helicopter". Even though this ancestor of modern helicopters was never bound to take off, the inventor still managed to create directional air streams with his aerial screw. This led to an unintentional creation of a first ceiling fan.



1734

The Houses of Parliament see the first application of a steam-driven axial fan to remove foul air. It was this event that marked the starting point for the development of ventilation systems.



1750

Russian scientist Mikhail Lomonosov creates the theory of free movement of air and smoke in ducts and pipes. His work "On free movement of air in mines" lays the groundwork for the theory of calculating air heating systems and thermally-induced ventilation systems. Lomonosov also creates the first prototype of a device to indicate air speed and direction.



1754



Swiss, German and Russian mathematician and mechanic Leonhard Euler publishes a paper which describes approaches to calculating ventilation systems. The basic principles from this paper are still used by modern-day designers.



The world-famous physicist Antoine-Laurent Lavoisier proves that expiration produces carbon dioxide which in high concentrations may cause people to feel unwell and short of air. This discovery provides a powerful impetus for ventilation system development.

1810

The town of Derby commissions the world's first natural ventilation system based on a scientific calculation.

1795

The Baltic German scientist and philosopher Wilhelm Christian Friebe lays down the fundamental principles which define air exchange intensity in heated spaces resulting from leaks in the building envelope, doorways and windows.

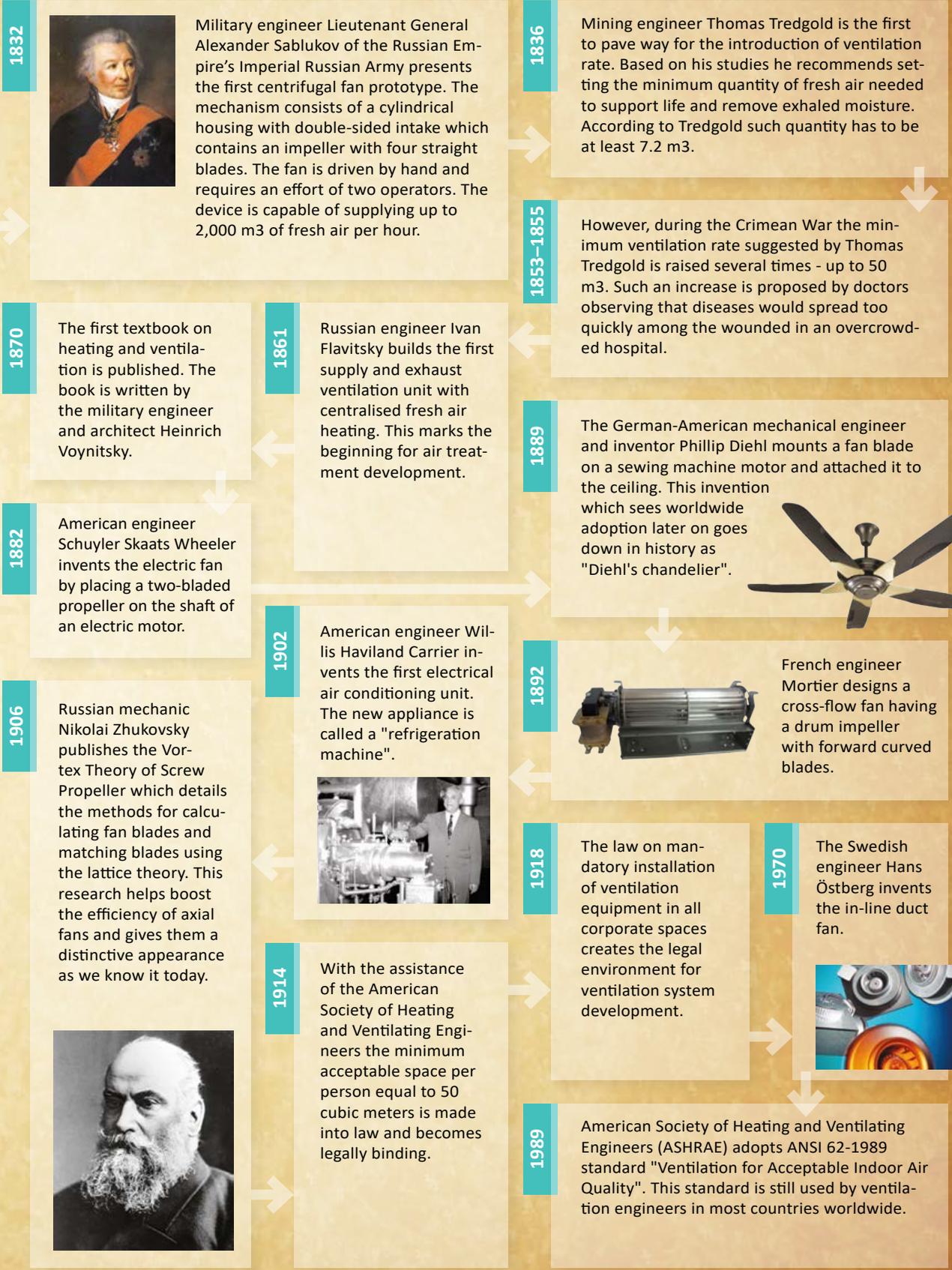
1775

The American inventor James Barron patents a fan moved by mechanism. The device represented a plate set in motion by an intricate mechanism of wheels, pinions and weights.



1815

Jean Fred. Marquis de Chabannes is granted the world's first patent for "certain improvements upon his inventions applicable to the purposes of warming, cooling and conducting air in houses and other buildings". From that point onwards ventilation and air conditioning has been regarded as an integral concept for the purposes of climatic equipment of buildings.





Fresh air is hard to find in in big cities covered with smog caused by smouldering peat fields, forest fires or waste incineration plants. As air pollution is becoming worse and worse each year ventilation has become an indispensable element of every modern home. The Dutch designer Daan Roosegaarde decided to tackle the problem in a big way and designed a powerful environmentally-friendly solution for cleaning city air. His device is meant to provide clean air in public spaces.

# BREATHE DEEPLY!

## New technology for cleaning city air

**W**hat you see is not a New York subway head house or a futuristic transformer. This is the world's largest air purifier and at the same time the most unusual gem generator. Aren't you excited yet?

Daan Roosegaarde's device is a tower over 7 m in height housing the equipment which not only filters the ambient air but also helps produce small stones from compressed smog particles. Each stone is a result of cleaning thousands cubic metres of air. However these stones

are not just rubbish: they are used for making stylish jewellery for the eco-conscious: by sharing the smog free ring you donate a 1000 m3 of clean air to the city.

How does the purification work? Charged electrons send positive ions into the air attracting fine dust particles. The harmful particles are then collected in the tower and compressed into unique stones. This is how waste can generate income in a most unusual way.



*This is how air pollutants are turned into stylish jewellery*



The unit  
is a giant 50 m  
wide round  
vacuum  
cleaner



www.kuiprater.com



**D**aan Roosegaarde's collaboration with the engineers of Delft University of Technology produced yet another powerful device to combat air pollution. The 50 m wide circle is essentially a giant vacuum cleaner. There is a 4 m high vacuum tower in the middle while the copper coils are placed underground. A charged electrostatic field by energising the electric coils with electric current of particular intensity and frequency. All fine particles larger than 10 nm dispersed in the air are also positively charged

and dragged to the ground where they are trapped in ion filters. According to the engineers this makes air up to 75–80 % cleaner.

The main advantage of this technology is reliability and safety as electromagnetic field is practically harmless for human health. Today such purification approach is widely used in medical facilities. The new technology is also very economical. Cleaning 30,000 m<sup>3</sup> of air only requires 30 W of power which is comparable to a conventional light bulb.

*The inventors say  
that their technology can  
purify air with up to  
75-80 % efficiency*



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*Air is what  
the man is most  
open to.*

*- Elias Canetti*

## VENTILATION AS ART



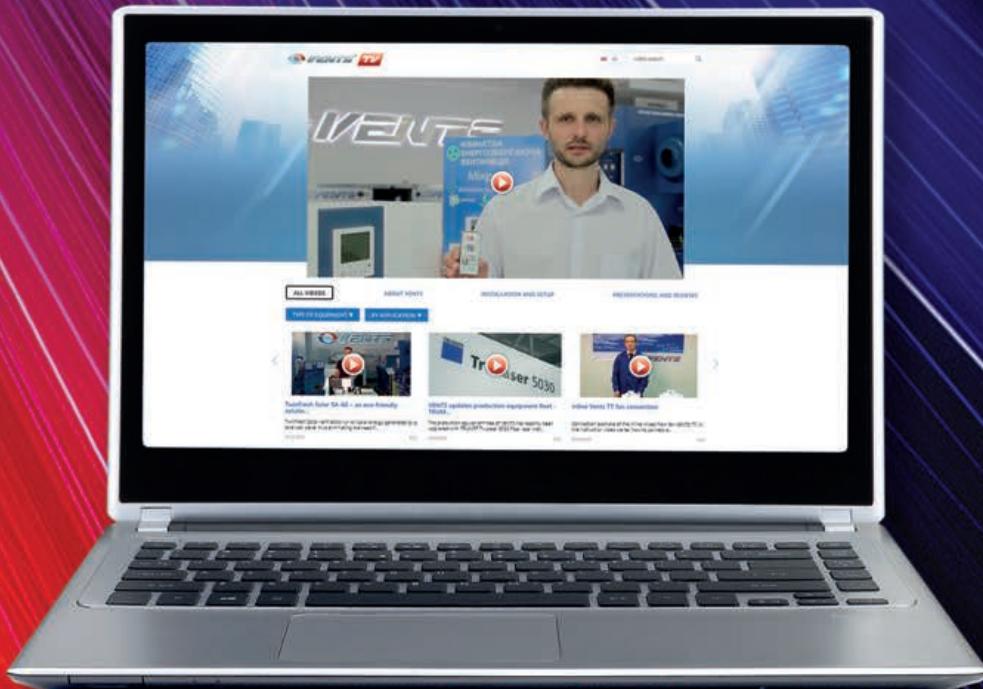
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