

# Clean air at the workplace



**KMA ULTRAVENT® air extraction  
and filtration systems:**

**environmentally friendly**

**energy efficient**

**money saving**



# KMA ULTRAVENT® – the modular high-performance emission control system for clean air at the workplace

**Environmental protection is the global challenge of our time. The reduction of pollution and CO<sub>2</sub>-related processes is thus gaining an increasingly significant role within companies.**

ULTRAVENT® is the modular waste air filtration system by KMA. Its sensibly adapted elements allow for accurate adjustment of the filter system to meet requirements. In this way, dust and smoke, as well as sticky or oily aerosols and various smells, can be removed highly effectively. Additionally, the process heat can be recovered in a very energetic way. ULTRAVENT® emission control systems are designed to assure compliance with the strict European legislation concerning occupational safety and environmental protection.

The application areas of the KMA ULTRAVENT® system are as diverse as the flexible compositions of the modules system. In many industrial manufacturing processes KMA ULTRAVENT® offers the most energy efficient solution for the exhaust air problems.

In addition to many other applications, the ULTRAVENT® is used primarily for the following areas of application:

- **Metal Processing:**
  - foundries
  - machines
  - presses, forging
  - reflow processes, soldering
  - welding shops, welding robot systems

- laser and gas cutting machines
- electroplating processes
- erosion machines

- **Food Processing:**
  - frying and deep-frying machines
  - cooking Units

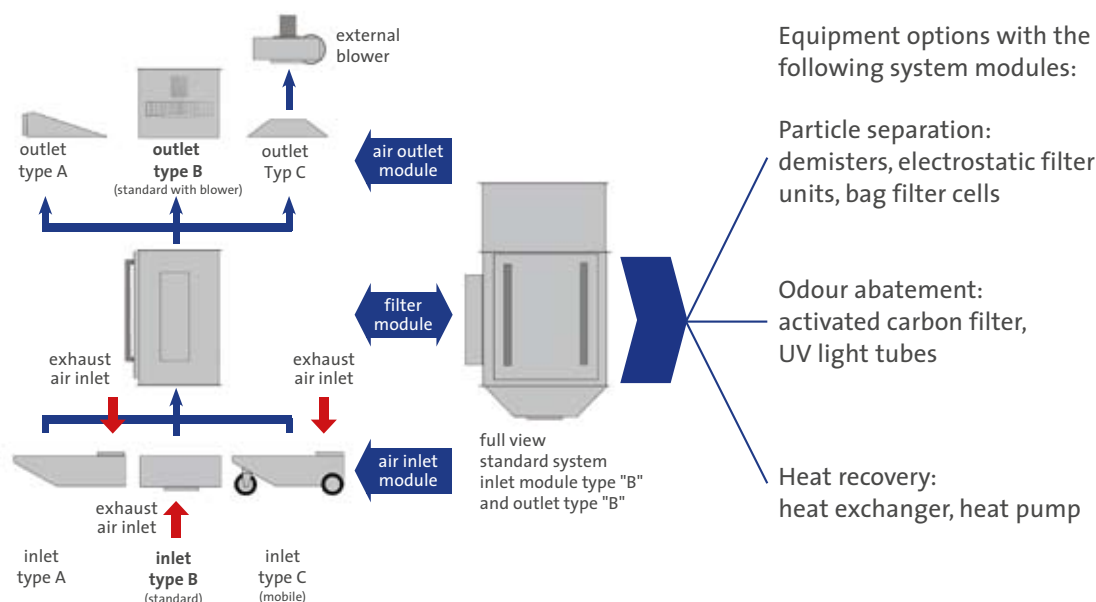
- **Textile Processing**
  - stentering frames

- **Plastic and Rubber Processing**
  - extrusion lines
  - vulcanizing
  - foil production
  - malleablising furnaces

## Filter elements as a set of modules

Depending on the type of emission ULTRAVENT® can be equipped with demisters, electrostatic filter units, bag filters, activated carbon elements, UV light tubes or heat exchangers and heat pump for heat recovery. Retrofit kits for subsequent modifications are available as well. Thus, the ULTRAVENT® air purification system remains flexible and can be adapted to any change of the exhaust air process. The filter inlet and output modules are variable and can be adapted to the needs of the plant as well.

## Schematic illustration of the KMA modular system





## Clean air by ULTRAVENT®

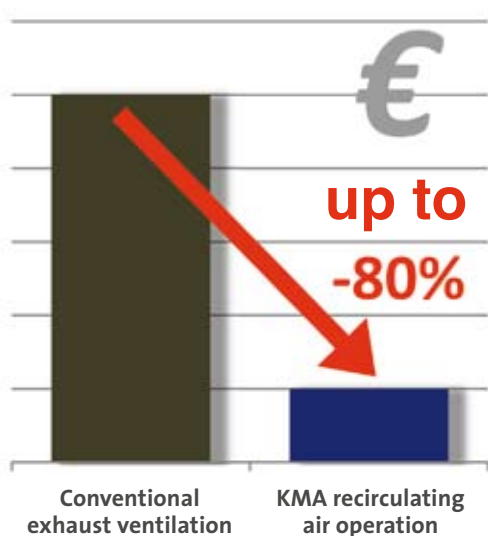
### Preserving the environment and reducing the costs – the efficiency factor

#### The degree of efficiency is crucial

ULTRAVENT® exhaust air filter systems allow the purification of the indoor air in energy-saving manner: High energy efficiency can be achieved in a recirculating air mode as well as in an exhaust air mode. Exhaust air blowers and excessive heat loss can be avoided during the heating period by the recirculating air mode, because the filtered air is returned to the working place. During the exhaust air mode, however, large amounts of energy can be recovered and be used for follow-up processes through the installation of a highly efficient heat recovery system. In both cases, the total energy

consumption of conventional exhaust ventilation systems decreases up to 80 % by using ULTRAVENT® air filtration technology.

ULTRAVENT® air filtration systems ensure clean air. This is the compliance with labor and environmental protection measures in the workspace. In addition, buildings and machines stay clean – resulting in lower maintenance and cleaning costs. Due to the energy-saving operation the heating costs of the building get reduced as well.



The illustration shows the considerable cost saving potential, achievable with ULTRAVENT® air filtration systems.



The Greek letter  $\eta$  ("eta") symbolises the effectiveness and the degree of efficiency for the utilisation of energy.

KMA's corporate philosophy is characterised by environmental efficiency – and therefore the connection between the degree of efficiency and environmental friendliness.

For KMA air filtration systems, environmental sustainability does not go against cost effectiveness. In fact these two factors complement and benefit one another.

# The ULTRAVENT® air filtration system – flexible and cost efficient

## The 6 module components for separating smoke, dust, mist, fumes and odours at manufacturing facilities

*The KMA ULTRAVENT® exhaust air system allows the highly efficient collection and separation of emissions like mist from release agents, oil mist, plasticizer fumes, emulsion mist as well as odours. Optionally, the process heat can be recovered by an integrated heat exchanger and used for follow-up processes. Due to the special filter design liquid components (oil, emulsion, etc.) get discharged during operation. Adhesive substances can easily be removed by the optional automatic filter cleaning system.*

### 1 Demister

The ULTRAVENT® demister units consist of robust 25 mm or 50 mm thick stainless steel mesh wire elements. This wire is held in position by ex-



panded metal mesh, both on the incoming and outgoing side of the gas flow. The special shaping of the wire allows for a high separating capacity



for aerosols, droplets, and mist. The units can be washed for cleaning. Changing the demister elements is not necessary.

### 2 Electrostatic precipitator

ULTRAVENT® electrostatic filter cells assure the highly effective separation of smoke, dust, and fine mist. “Blue haze” caused by the use of



release agents gets separated effectively as well. The filter cells are characterised by the particularly robust design: frame, electrode and carrying bars made of stainless steel, collector plates optionally in aluminum or stainless steel, insulators in oil-resistant ceramics and an optimised design for the separation of liquid or viscous substances. These features make sure that the electrostatic filter is an economical and durable filter medium for many applications.

Often two categories of contaminants are captured in the electrostatic collection cell. One kind of the filtered substances is liquid, drips off



the collection plates, and is collected in a recuperation tank. The oil separated here can often be reused. The second type forms a greasy, oily or encrusted deposit on the filter surface. Unsuitable filter types can quickly plug and become ineffective, leading to excessive costs associated with filter replacement and disposal. However, electrostatic precipitators never obstruct the air flow through the exhaust system.



### 3 Mechanical Filters

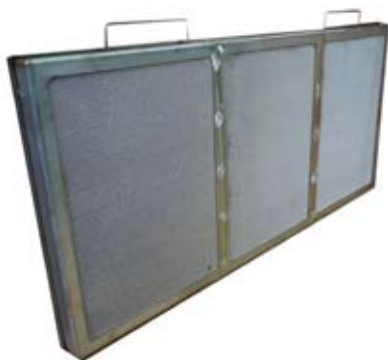
The ULTRAVENT® modular system offers a wide range of mechanical filter cells for almost any application. They are available as a pre-filter (filter class G), as a powerful main filter (filter class F), and as a HEPA filter (filter class H) with enormous



precipitation performance. Special filter cells (e.g. with drainage fabric for emulsion separation) are available for many applications. Please ask our consultants for the suitable KMA cell for your appliance.

### 4 Activated Carbon Filter

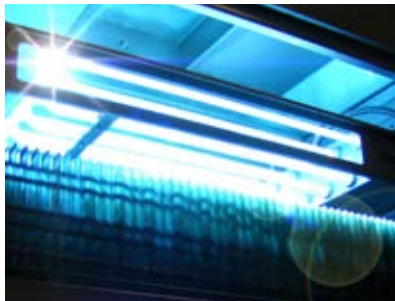
Activated carbon and activated lignite effectively adsorb many different kinds of smoke and odours. They are considered to be universal



filters for odour removal. For an economic operation a good pre-treatment of the exhaust air always helps: aerosols and dust have to be separated before the carbon filter. ULTRAVENT® activated carbon / activated lignite elements are filled with refillable bulk carbon. This ensures a long-lasting and economical operation due to the greater mass of carbon.

### 5 UV light for odour abatement by photo-oxidation

With UV light, many intensely smelling VOC molecules can be oxidised. The result is a significant improvement in odour. In many cases, bad smells are completely eliminated. UV light needs, just like activated



carbon, a good pre-filtration of dust or smoke in order to achieve full and long-term effectiveness. A reaction section or an active carbon catalyst, following the UV-oxidation stage, is always required to complete the oxidation process.

### 6 Heat exchanger

By integrating a heat exchanger in the ULTRAVENT® filter system a recovery of the process heat is made possible, in addition to the air purification. At low air temperatures, the heat recovery can be optimised by a combination with the highly effi-



cient KMA Ambitherm® heat pump. The recovered heat from the exhaust air heat can be used afterwards for follow up processes (e.g. water or air heating). The immediate installation of the heat exchanger next to the filter zone allows regular cleaning by the automatic filter cleaning system.

*KMA ULTRAVENT® filters are characterised by the following features:*

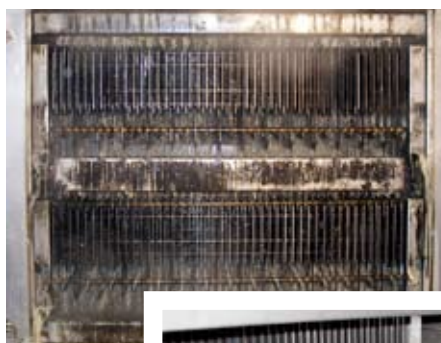
- *Cost-effective operation through wear-resistant filters and low energy consumption  
(Usually the cleaned air flows back into the work area)*
- *Minimised maintenance due to highly effective automatic filter cleaning*
- *Flexibility through a modular system with many different sizes*
- *Durability: filter housing and collection cells are made from stainless steel on request*

# On the steady path to perfection – optional accessories can improve and facilitate the operation of your emission control system

## Automatic filter cleaning system (CIP)

An automatic filter cleaning system is available for many types of ULTRAVENT® emission control systems. It is suitable for cleaning all washable filter media such as demisters, electrostatic collection cells, heat exchangers or UV light oxidation units.

The automatic ULTRAVENT® washing system is unmatched in terms of comfort and cleaning results – due to its movable nozzle bar that moves back and forth above the collection cells during the filter washing process. It allows the regular and labour-saving cleaning of the filter cells and thus ensures minimal maintenance requirements. The intelligent control of the washing system simultaneously reduces the consumption of water and of purifying agents.



Before  
cleaning  
cycle



After  
cleaning  
cycle



PLC-controller

## Fire protection and fire extinguishing systems



ULTRAVENT® systems are widely used on machines which represent a certain fire hazard. All KMA systems are available with fire sensors and fire extinguishing systems as an option.

In case of fire, the system ensures that the filter device will be flooded with an extinguishing gas (carbon dioxide or argon). As a result, further damage to the equipment can be avoided.

## PLC – programmable controllers

ULTRAVENT® emission control systems are available with either contactor control or PLC. The PLC option is recommended when using the CIP cleaning device or in case of connection to a central monitoring system.

Siemens S7 is used as the standard PLC at KMA. It allows the permanent monitoring and logging of all filter functions. It also enables the monitoring of connected media (e.g. electricity, if applicable: water or compressed air for filter cleaning). If the CIP cleaning system is part of the filter unit, the PLC allows for the convenient programming of cleaning time, temperature of washing water, and more.

In addition, the PLC allows the connection of the filter system to central control systems (BMS) and remote monitoring / service routines, which is an important aspect of ISO 14001 certification.

## Heat recovery

Provided that the purified air is to be conducted outdoors, the ULTRAVENT® filtration system can be upgraded by a heat exchanger unit. In this case there are two different methods of heat exchange.

### Air-to-air heat exchanger:

With the air-to-air heat exchanging concept, the heat exchanger cell is located above the filter module and comprises a flange for the fresh air duct. The warm exhaust air flows through the integrated air-to-air heat exchanger from the bottom to the top. Cool air from outdoors is directed horizontally through the device and is heated up. Both air flows have to be led through the heat exchanger in a counter current way. Thereby the incoming air and the exhaust air are separated by a heat-conducting surface, so the two cannot be mixed with each other.

### Finned heat exchangers; optionally with high-efficiency heat pump

The warm exhaust air from the machines is lead to a central ULTRAVENT® filter system with integrated fin tube heat exchanger. Finned heat exchangers consist of a plurality of fins, which are bound to the core tubes by pressed on. Fin tube heat exchangers work on the gas-/

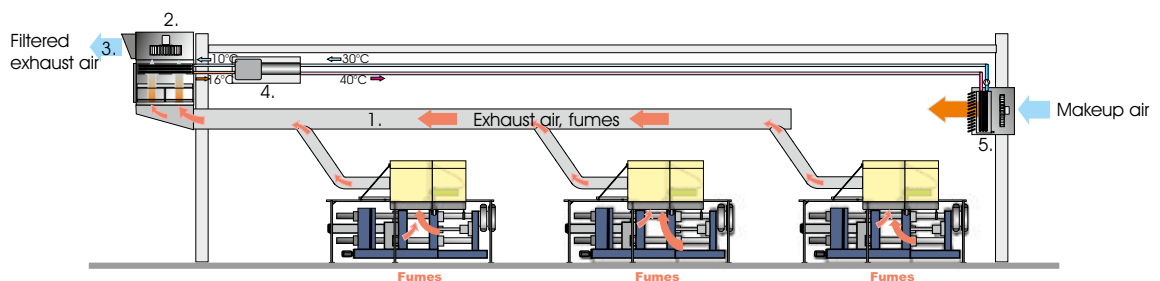
liquid-principle. Here, the heat-conducting fluid flows – in the form of brine or cold agent – through the core tubes, while the gas or the hot exhaust air flows between the fins. Finned heat exchangers are efficient and can achieve good efficiencies due to the good heat transfer and large surfaces. Finned heat exchangers are ideally suited for large air volume flows. Depending on the temperature and application, as material aluminum, copper or stainless steel can be used.

At low temperature-process the efficiency can be increased by the integration of an Ambitherm® heat pump and the process heat can be generated from 30° to 60° C (e. g. for heating up inlet air or domestic hot water). The Ambitherm® system ensures a direct transfer of the energy to the follow up process without a buffer tank. The coefficient of performance (COP > 6) is significantly higher than many comparable systems. The result: an extremely economical operation.

For larger distances between the waste and supply air a circulation system can be created by installing a second heat exchanger for the heat recovery. Here, an air cooler and an air heater are connected via a circuit to each other. Depending on the application, the request or the season the circuit connected system can be used for heating or cooling.



### Exhaust air filtration in WINTER: economic heating of the hall with waste heat

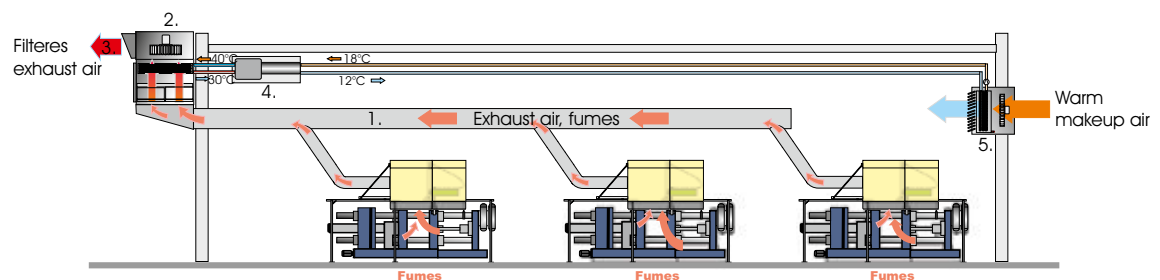


#### Exhaust air filtration with heat recovery by heat pump:

1. Fumes and exhaust air from die casting machines
  2. Central filter with precipitator and heat recovery system.
  3. Exhaust air flows out into the open
  4. The heat pump generates hot water (40°C) for heating
  5. Makeup air passes through an air heat exchanger into the hall
- (Data are exemplary)



### Exhaust air filtration in SUMMER: cooling of makeup air with exhaust air



#### Exhaust air filtration with makeup air cooling by heat pump:

1. Fumes and exhaust air from die casting machines
  2. Central filter with precipitator and heat exchanger system cleans and heats up exhaust air.
  3. Exhaust air flows out into the open
  4. The heat pump generates cold water (12°C) for cooling
  5. Makeup air passes through an air heat exchanger into the hall
- (Data are exemplary)



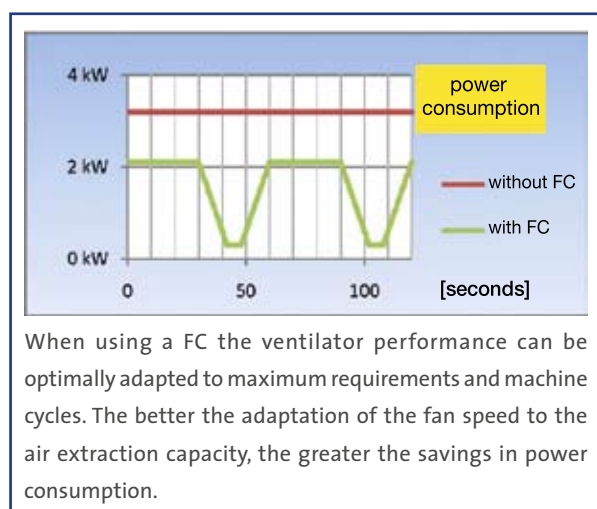
## KMA ULTRAVENT® emission control systems type ECO<sup>+</sup>

### More energy efficient – more environmentally friendly

#### The future begins today: more efficient use of resources by ULTRAVENT® ECO<sup>+</sup>

*Air movement in production processes is a major consumer of energy. Blowers without a frequency converter (FC) run constantly at 100% capacity. Dampers control the air flow and thereby consume energy. The ECO<sup>+</sup> technology offered by KMA represents an alternative with maximum energy efficiency.*

#### Large potential savings due to frequency converters (FC)



KMA ULTRAVENT® emission control systems are very energy efficient because they minimally impede the flow of gases through the device. The ventilators used are equipped with energy-saving EFF2 class motors.

Nevertheless further savings can be obtained through intelligent control: blowers basically always run on constant speed and therefore deliver a consistent performance, which is designed to the highest possible power requirements. In practice, however, usually only 70-90% of the power is required, and even less in case of fluctuating loads.

ULTRAVENT® ECO<sup>+</sup> systems are equipped with a frequency converter for fan speed control. Thus, the speed can be adjusted according to requirements. Even a small reduction in speed leads to significant energy savings. In case of connection to the control of the manufacturing machine, a permanent speed adjustment is possible. The result often is an additional energy cost savings potential of up to 50%.

#### The advantages at a glance:

- Energy savings of up to 50% compared to conventional filter systems through intelligent ventilator control
- Individual adjustment of fan speed to the exhaust capacity of the production plant
- No conditioning of ambient air – saving of heating costs during the winter season
- Reduction of CO<sub>2</sub> emissions

*Optimisation and efficiency go hand in hand. In cooperation with your company, we can provide individual and tailored solutions – customised to your specific needs.*



## Take advantage of KMA's philosophy: Individual solutions for various requirements

### Exhaust air technology

#### Recirculating or exhaust air mode?

The KMA ULTRAVENT® is suitable for recirculating as well as exhaust air mode. In the recirculating air mode the purified air is led back into the production hall. Therefore, a highly effective separation is essential. In exhaust air mode the purified air is conducted outdoors. Before this occurs, the energy is extracted out of the exhaust air by a heat exchanger. By the use of an additional Ambitherm® heat pump the degree of the heat recovery can be increased significantly. Which system is applied, will be decided according to the specific needs of the customer.

#### Centralised or decentralised?

KMA ULTRAVENT® filtration systems allow centralised or decentralised extraction concepts. In the decentralised extraction concept each machine is equipped with a KMA

exhaust air filtration system. Here, no expensive and complex exhaust pipes are required and the operation remains flexible, if there is any planning about future machine enhancements.



In a centralised extraction concept several machines are connected to a single filtration system. The investment costs for a centralised filter are usually lower than for several smaller filter systems. However, the cost of pipelines must be taken into account. The duct conduction is sometimes problematic for large air ducts.



### Filter housing

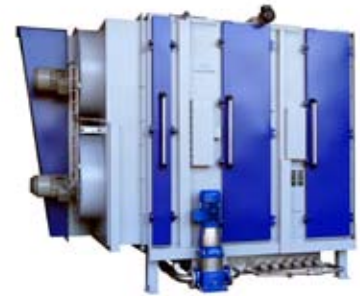
#### Painted sheet steel or stainless steel?

ULTRAVENT® provides flexibility in terms of material selection for the filter housing: for applications with aggressive substances stainless steel casings are available – in addition to the conventional sheet steel casings version.



#### Modul sizes

KMA ULTRAVENT® exhaust filtration systems are available in different sizes. The module sizes are staggered and aimed at the exhaust air volume, which needs to be purified. The largest module unit has an air capacity of 30,000 m<sup>3</sup>/h. ULTRAVENT® systems are characterised by a compact



design. At higher air quantities, two or more filter modules are simply connected side by side.

*Centralised  
extraction concept*

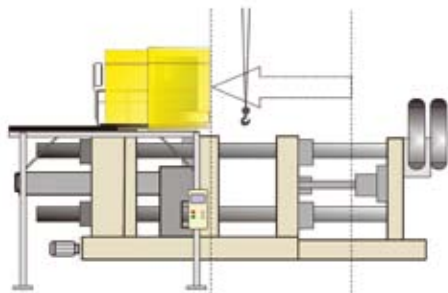
*Specific problems require specific solutions.*

*Ranging from measurements on site, to flexible module systems, to individual adaptations, and to special layouts such as extraction arms, nozzle plates and air curtains. Talk to us – we will find a way.*

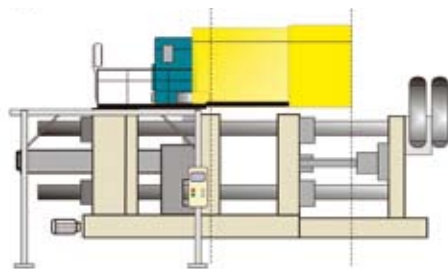
## KMA ULTRAVENT® extraction devices - Variety of models for different requirements

### Tailor-made solutions for every application

*KMA ULTRAVENT® has a wide range of standardised, modular extraction devices. This allows for tailor-made solutions and yet provides the advantage of series manufacturing. At the same time the module system allows for individual adaptations at the site of operation. As a result, special openings, integrated moving doors, or similar installations can be integrated in order to collect and extract the pollutants directly at source. This is the only method to prevent indoor air pollution effectively.*



Fume extraction hood, **open** for free access



Fume extraction hood, **closed** and in operating condition

### Integration into the manufacturing process

The fume collection near the source of emission is crucial for the air quality in the production hall. However, it is essential that this does not hinder the production process. Therefore, KMA hoods can be moved aside to allow for entirely free access to the area around the production machine.

### Effective fume collection

Due to the special hood design inside the hood (deflector plates) even strong and intermittent fume emissions can be securely collected and removed. Flow baffle plates ensure that the main air suction effect is focussing on the emission-critical areas of the hood's bottom edges.

### Fume extraction hoods

For heavy-duty machines ULTRAVENT® extraction hoods are available in one and two-piece versions. If required, the regular or space-saving telescopic hoods can be moved aside, sliding on rails. The movement is carried out either manually or by a hood motor drive.





### Air curtain systems

Air curtain systems are used where limited space or other obstructions at the workstation will hinder the installation of extraction hoods. The KMA air curtain system consists of two elements: the blower unit that is attached to one end of the machine, generating an entirely adjustable horizontal air current above the source of emission. The second element is the extraction unit placed at the opposite end, receiving the air current including the contaminated air stream from the machine.



Air curtain systems usually require a higher extraction capacity than a comparable hood, because they do not have the possibility of buffering thermally rising fumes. However air curtains offer the advantage that the working area is not covered or obstructed by a suction device.



### Pivoting extraction arms

KMA offers a wide range of fume collecting devices. The extraction arms can be connected directly to the filter unit or provided as a wall-mounted arm in various lengths and diameters. A free-standing extraction column with a slewing range of 360° is available as well.

### Nozzle plate fume extraction

The nozzle plate extraction device permits a highly effective collection of smoke, dust and fumes, which doesn't need to be channelled through a high level of kinetic energy. The nozzle plate is usually located above the source, but lateral installations also allow for good collection results when set up appropriately.



### **ULTRAVENT® UV-H 30000**

*KMA centralised filtration system connected to 4 die casting machines of different sizes (from 250 to 400 tons).*

*Facilities: Double electrostatic precipitators, automatic washing system and one extraction hood on each of the four casting machines.*



## **Quality generates satisfaction – throughout the world**

KMA ULTRAVENT® air filtration systems are high-quality products of mechanical engineering, designed for highest requirements.

Filter housing in noncorrosive versions, robust collection cells in durable stainless steel / aluminium design, and heavy-duty electrical components ensure that ULTRAVENT® emission control systems are working satisfactorily and reliably even after many years in demanding continuous operation.



### **5 x ULTRAVENT® UV-II 15000/EE**

*Central emission control system for 7 forging presses, extraction of smoke from oil and release agents*



### **ULTRAVENT® UV-II 16000/EE-EW16**

*Central emission control system for the air extraction at 10 machine tools, extraction of emulsion mist*



#### **ULTRAVENT® UV-II 10000**

*Centralised air filtration system connected to 5 machines. For the separation of oil and emulsion mist. ULTRAVENT® is equipped with an electrostatic precipitator and a collection barrel for oil recovery.*



#### **ULTRAVENT® UV-II 8000**

*Decentralised filter system with one-piece extraction hood for exhaust air purification of a die casting machine. Exhaust air volume 6,500 m³ / h. Filter system works in a recirculating air mode and is equipped with double electrostatic precipitators and an automatic cleaning system.*



## **More than 2,500 installed filter systems for many different applications**

KMA Environmental Technology stands for quality and innovation. This is proven with more than 2,500 filter systems installed worldwide. Their utilization results in the reduction of environmental pollution caused by smoke and odours. At the same time they make an important contribution to climate protection due to minimal energy consumption.

Meeting the highest requirements concerning reliability of our filter system's development and operation as well as consistent service are paying off – again and again proven by the satisfaction of our customers.



#### **ULTRAVENT® UV-II 5000/EE**

*Emission control system connected to a machine for the production of plastic films, extraction of paraffin and monomers (plasticizers)*



#### **5 x ULTRAVENT® UV-II 15002/EE-EW15**

*Decentralised emission control system for 5 'Bühler' die casting machines 2200t, extraction of smoke from release agents at the die spraying robot*



#### **ULTRAVENT® UV-H 30000**

*Centralised large filter system for separating oil smoke from frying, cooking and deep-frying systems with an exhaust air volume up to 30,000 m³/h. Equipped with electrostatic filter units for particle separation, fin tube heat exchangers for heat recovery and UV light for odour abatement.*



#### **ULTRAVENT® UV-II 15000**

*KMA filtration system installed above a stenter frame for the separation of oil smoke and dust particles (fibrous material). With the integrated heat exchanger the waste heat is recovered and used for follow-up processes.*



## **KMA ULTRAVENT® emission control systems**

### **Your advantages point by point**

Through trend-setting ideas KMA ULTRAVENT® filter systems combine numerous advantages. Whether designed as centralised or decentralised system, with energy-saving recirculating air operation or equipped only with washable collection cells – our engineers have taken everything into consideration.

KMA emission control systems are suitable for machines of all sizes and makes. ULTRAVENT® filters are modular in design and adjustable to production processes on-site. Both the connection to a central filter system, as well as decentralised solutions are feasible. Individual solutions and customised implementations to meet your requirements are always possible.



#### **ULTRAVENT® UV-H 30000**

*KMA filtration system (centralised) connected to five forging presses for the production of nuts and for the separation of oil mist and oil smoke. According to requirements, the operation can be switched to a recirculating air mode or an exhaust air mode.*



## KMA – your reliable partner for modern filter technology

### Energy efficient and cost-saving

Since KMA ULTRAVENT® filter units often operate in the energy-efficient recirculating air mode, heating costs can be significantly reduced in the winter months. An intelligent blower control can save additional energy costs compared with conventional exhaust ventilation systems. In many cases the total energy consumption of typical filter devices is reduced by up to 80 percent using ULTRAVENT® air filtration systems.

### Service-friendly and long-lasting

ULTRAVENT® systems only use washable filter media such as demisters or electrostatic precipitators. The expensive replacement of used filter media is not necessary. The automatic filter cleaning system cleans the filter elements regularly and ensures minimal maintenance. In addition, KMA filters are made of high-quality material, making them extremely robust and long-lasting.

### KMA-Filter – committed to the environment

The company KMA is characterised by people who, above all, are convinced that producing energy-efficient air purification systems makes an active contribution to the protection of the environment and reduces the greenhouse effect. This is in all of our interests; and will benefit future generations.

**Protecting the environment  
while saving energy and costs.**

**No problem with KMA emission control systems.**

**Our environment is our future.  
We will be happy to inform and  
advise you about our innovations.**

### What can we do for you?

We are happy to provide you, free of charge, with a proposal for a system configuration which is exactly adapted to your needs. Using comprehensive equipment descriptions and detailed operating cost comparisons, we develop an economically optimal solution for you.

### Our service package includes:

- Consulting
- Applications concerning environmental legislation
- Delivery of complete air filtration systems
- Service

Give us a call, send us a message  
or visit us on our website.

We look forward to your request.

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