



**Established 24/7 technology for the separation of dust and fume during compounding processes**

Reduced consumption of resources with dry separation. Wet separation with water circulation. Durable functionality with proven components.



Fume extraction at an extruder

# Efficient and reliable 24/7 separation of emissions

**All-in-one solution for maximum efficiency during compounding and extrusion processes.**



Extensive demands are placed upon all components to ensure maximum productivity during the refinement and packaging of plastics employing plastics granulation.

Besides process technology, a major consideration is the collection of dust and fumes and controlling the air quality inside the workplace.

**Keller Lufttechnik analyses specific processes and delivers turn-key all-in-one solutions**

Keller Lufttechnik has considerable experience with the treatment of dust, fume, gaseous and adhesive aerosols released during compounding and extrusion processes. Utilizing established technology, emissions are extracted properly at the source and separated in centralized or decentralized systems.

Fillers, fibers, additives, pigments and liquids (curing agents and lubricants) do affect emissions in a variety of ways. Since dusts can be flammable or explosive, Keller offers comprehensive advice and performs appropriate analyses.

... with proficiency and expertise



Example:

The delivery and supply of raw materials is managed differently, depending on demand and physical location. The prototype illustrated in this brochure assumes supplying with Big Bags or sacks.

The dosing stage is located above the extruders and the raw materials are dispensed above the dosing stage.

**Three extraction systems combined can fulfill all the extraction requirements**

Aerosols and fumes are released during extrusion processes. They are captured with collection hoods, rinsed with water and fed to a wet scrubber.

The wet scrubber utilizes water as filtration medium – with the advantage of a maximum operating safety despite adhesive emissions.

Dusts from the treatment section (mixing, weighing, feeding) are added to a dry separator. Pollution and surface dust is extracted manually with another vacuum creating dry system. As a general rule, other designs and configurations are possible, upon request.

**Perfect for start-up, renovation or retrofitting**

The modular design of Keller components provides a variety of solutions. Compact single systems can be equipped with the same high-efficiency technology as systems with several compounding lines.

Harmful substances such as sedimented sludge can often be collected. (See page 11)

Keller systems are suitable for initial start-up, renovations, or retrofitting of existing systems.

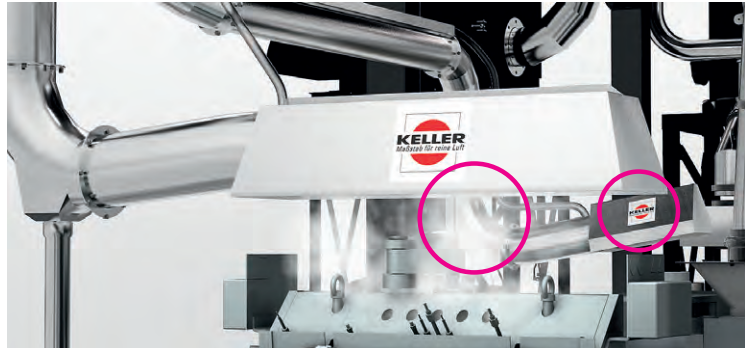
# Reliable separation of emissions and fumes at the extruder

## Degassing during extrusion processes

The degassing of volatile components occurs in the degassing zone at the extruder head, during fabrication of plastic compounds such as molten polymer, vinyl acetate, POM, PC, and ABS, thereby removing fumes, airborne particulate, and adhesive aerosols.

Without suitable extraction methods, these emissions would otherwise be directly discharged into the environment.

This is the primary reason for taking into consideration the presence of hazardous agents and the air quality standards within the workplace.



Fumes from degassing at the extruder head and at the preliminary degassing step can be collected by extraction hoods and directed to the separation

## Air decontamination is the basis for specific requirements

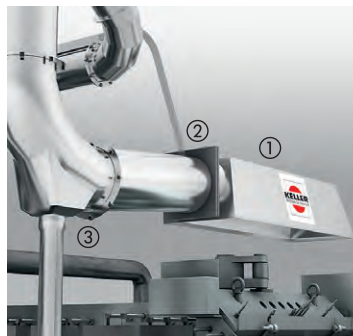
Requirements for the air quality at workplaces and the reduction of airborne pollutants are described in VDI guideline 2262-3.

Workplace limit values are outlined in the Technical Rules for Hazard Substances (TRGS 900) of the Federal Institute for Occupational Safety and Health.

## Airborne pollutants must be extracted reliably

Airborne emissions from extruders must be reliably extracted. A key prerequisite for optimal fume collection is installing the correct extraction hood.

Since extruder installations are customer-specific, Keller offers a wide range of movable or stationary extraction hoods.



- ① Collection hood
- ② Pre-spraying
- ③ Return pipe

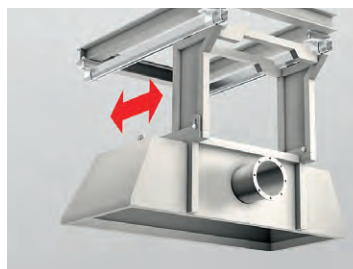


Folding collection hood (option) for an easy cleaning and preliminary spraying

## Additional exhaust air extraction during vacuum degassing



Connection of the fume extraction to the vacuum degassing station



Movable collection hood



Extraction through hinged support arms

**Adhesive aerosols have a tendency to accumulate in the dirty air ducts ...**

There exists a risk of deposit build-up from adhesive aerosols. System damage or breakdown could be the end result with the potential of igniting fires inside the ductwork.

**... but atomizing with water at the collection point alters this effectively**

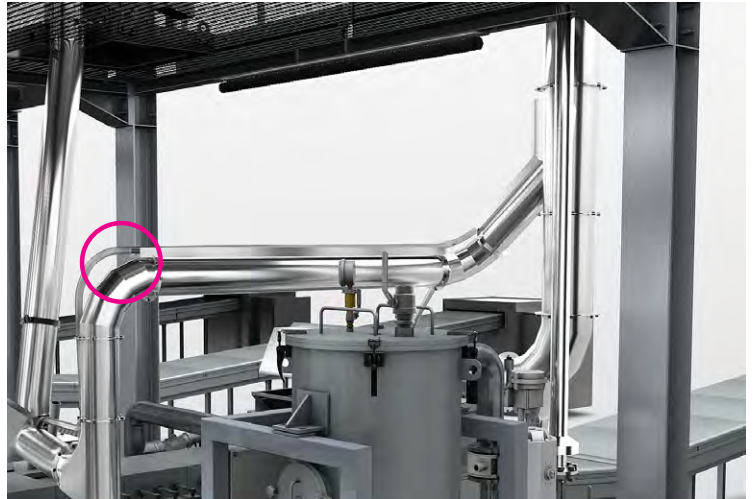
Pre-spraying occurs behind the collection hoods (condensation and pre-separation stages) which are connected to the central water supply. The preliminary spraying creates a dense and fine water droplet curtain which saturates the air moisture and cools down the extracted fumes.

**Airborne substances are flushed out with water**

Airborne substances are flushed out the dirty air duct and collected in a container together with excess water from the preliminary spraying.

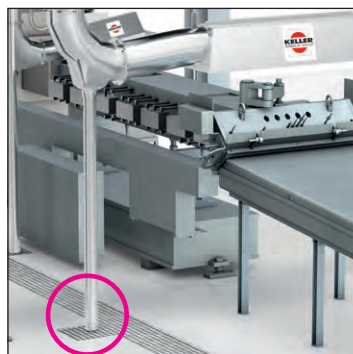
**The majority of the extracted airborne substances flow into the wet separator with the water droplets**

The dirty air ducts are free of deposit build-up to a great extent, which maintains consistent preliminary separation efficiency for longer periods of time.



This adiabatic cooling leads to condensation of gaseous components such as high flashpoint solvents following the preliminary spraying in the extraction pipes.

Pictured above: Water hoses for the preliminary spraying lie in the channels on the extraction pipes. Each spraying point is operated separately from the water treatment station.



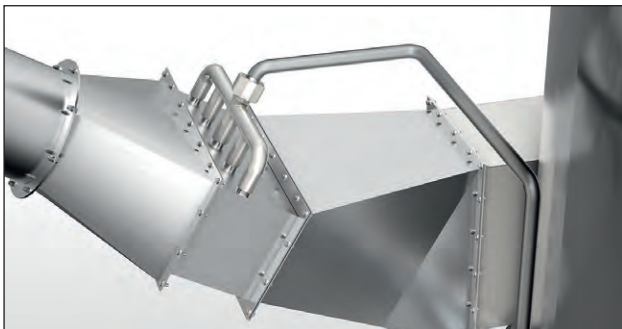
Water from the preliminary spraying is discharged by a separate channel for additional water treatment.



The technology of the VDN-TA wet separator is based on the Venturi principle

# Separation of water combined with air and emissions

**VDN-TA wet separator** VDN-TA wet separator consists of a combination of various components and functions. It offers a dual stage separation system with preliminary spraying and main spraying.



## Main spraying

The separated air is accelerated by the Venturi nozzle. A water curtain is formed directly behind the nozzle which moistens the solid and liquid aerosols.

## Separation of water droplets and air

The water/air mixture which radially flows into the droplet separator is separated by the cyclone principle. The water which is combined with airborne particulate flows out into a water treatment tank.

## Fan

Radial fans are used for wet separation processes.



## Water circuit

Because of the intensive use of water, the spraying system is based on a water circuit. Solely the volume of water from wetting the suction air and the sludge

discharge has to be refilled. The chemical consistence of the extrusion emission can require an additive feeding to the water circuit.

## Water treatment

The contaminated water is discharged into the water treatment tank via the pipe connection.

The water which is cleaned sufficiently by this separation in the water circuit can be reused for the spraying.

Additional waste water is pumped into the same tank. Sludge is formed from sediments and surface contaminants. Adequately treated water in this circulating system can be re-used for spraying purposes.

A skimmer is used for lightweight fluids such as oil for surface separation.

## ... with integrated de-sludger

The de-sludger is adapted to the specific flow conditions of waste water, circulating system water and replacement water.



Central water treatment

# Extraction of dusts from the treatment

## De-dusting bulk material upon refilling storage containers

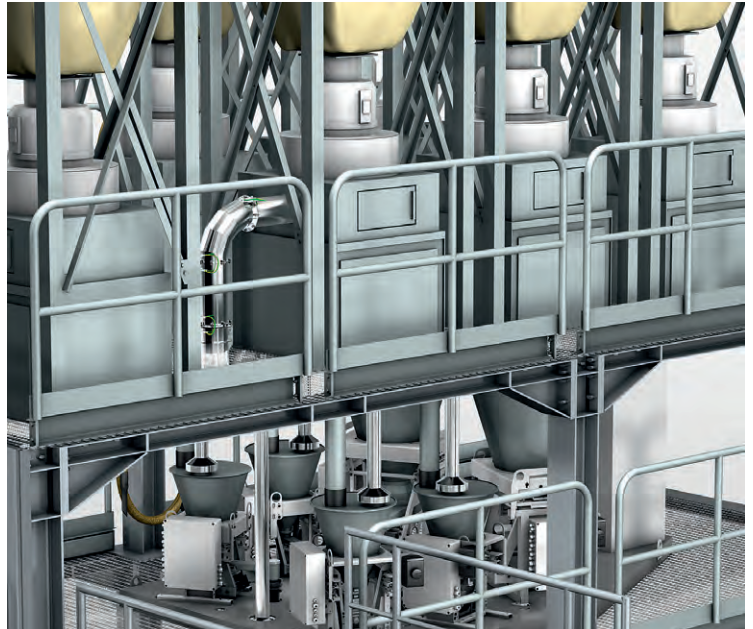
The compounding system is re-supplied with bulk material stored in Big Bags. Airborne particulate created inside a dust-proof system while re-supplying bulk material is separated and extracted.

Some supplies can be replenished through a flap. This also activates the extraction system.

## Separation of dusts from displacement air

Dust clouds may rise when pouring bulk materials onto the weighing scales. Special collection hoods separate dispersed residual dust at the end of the supply piping.

The material is conveyed through pipelines into the extruder. At the terminal end, replacement air and residual dust are extracted by optimized collection hoods.



Treatment platform with raw material added by Big Bags or sacks in the image above, below is the dosing stage.



Closed extraction to separate the bulk material during the feeding of raw material (Big Bags or sacks)



Dust separation with collection hoods at the weighing scales above hoppers.



Dust separation with collection hoods at the extruder's feed throats



## VARIO dry separator

VARIO dry separators in various sizes are used for the extraction of dry dusts. Y-filters efficiently separate dust particles.

With the use of efficient filters, the clean air can be re-directed into the manufacturing area.

The filter cleaning is effected by compressed air pulses during operation.



VARIO dry separator in standard design

VARIO dry separator (ATEX compliant) equipped with explosion pressure surge resistant housing design and suitable discharge lock. Additional flameless pressure relief is provided by a Q-Box or by a ProFlap back pressure flap.

## Caution! Dust explosion risk

An explosive environment can be created depending on the character and composition of the dusts.

For additional information please visit our homepage [www.exschutz.net](http://www.exschutz.net)

## Constructive explosion protection according to ATEX guidelines

If explosion protection measures according to ATEX 95/137 are required, relevant regulations are mandatory.

### Q-Box

The VARIO dry separator is equipped with a Q-Box for interior flameless pressure relief. Burst panels can be installed on an exterior wall for indoor installations, or on the exterior of the

VARIO housing for outdoor installations.

### ProFlap back pressure flap

A ProFlap back pressure flap provides effective additional explosion protection. The dirty air duct is closed automatically in the event of an explosion shock wave.

### Discharge lock

As another measure for explosion protection, VARIO disposes of a flame and pressure proof discharge unit.

# For manual dust extraction

## Central vacuum suction unit

In addition to the previously described extraction systems, it would be wise to utilize a highly efficient centralized system even for surface cleaning. Keller Lufttechnik offers a variety of vacuum suction systems.

## Components

The vacuum suction system consists of:

- Suction nozzles
- Channels with quick-connect couplings
- Piping
- Dedusting unit with round filter and collection tank
- Vacuum unit (adequate)

## Separation of dirt and dust

The dust attains the filter material as dust-air mixture with relatively fine particles through a pre-separation for coarse dirt particles. Dust is further filtered from the air flow and collected in containers or discharged by appropriate discharge systems.

## Vacuum creation

Several multiple stage fans, side channel blowers or rotary blowers are used to create a vacuum.

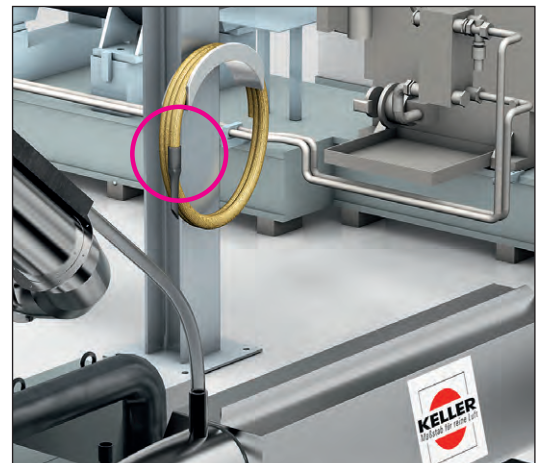
## Fire or explosion risk?

Many dusts are combustible and explosive. For information please see page 9.

Detailed information about ATEX, fire and explosion protection can be found on our homepage [www.exschutz.net](http://www.exschutz.net)

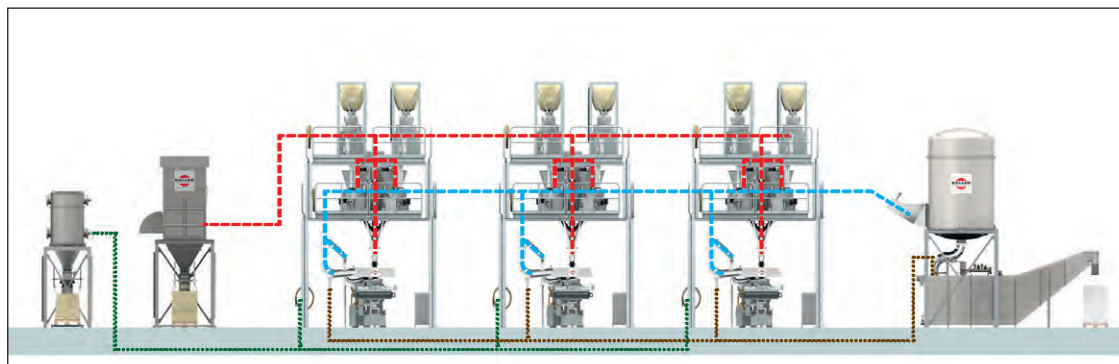


Vacuum suction system for operation with external vacuum pump

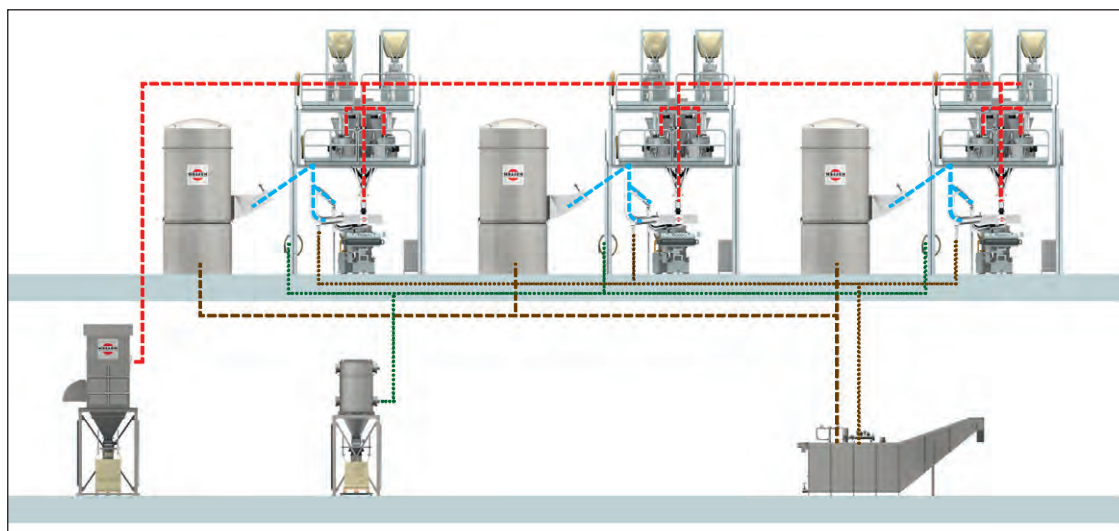


Suction hose with changeable suction nozzles. Several suction stations can be used simultaneously.

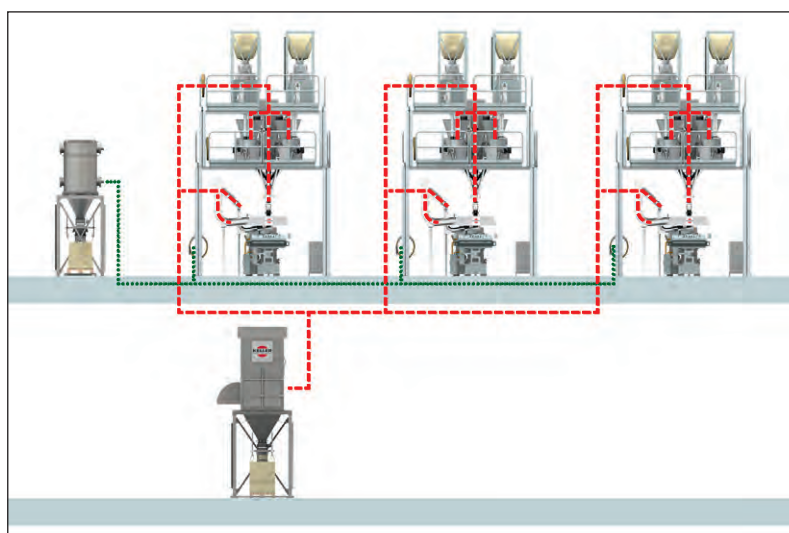
# Each solution can be customized



Wet and dry separation system, all components on the same level



System installation on three levels



Dry separation for dosing platform and extruder

- Wet separation extruder
- Water discharge (preliminary spraying)
- Waste water recirculation
- Dust extraction from treatment
- Discharge pipe for central vacuum system

# CLEACOM

## Your benefit from our experience

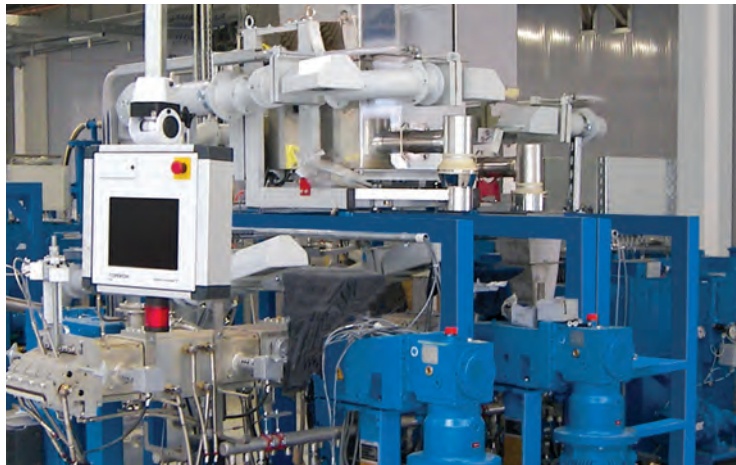
### CLEACOM project consultation

We are pleased to offer you a consultation without obligation by recommending individualized solutions for retrofitting, renovation or installing new systems.

Do not hesitate to contact us in the exploration period of your project.

We are especially qualified to provide you with specific information on fire and explosion protection.

Please visit our new homepage  
[www.exschutz.net](http://www.exschutz.net)



Collection of gases and aerosols at the extruder



Wet scrubber with water treatment tank



Dry separator



Central vacuum suction system

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