



SHIELD FIRE SAFETY SOLUTIONS

Fire risk under control in
welding fume extraction systems



DO YOU CONTROL THE RISK OF FIRE AT YOUR WORKPLACE?

We do. Plymovent presents *SHIELD fire safety solutions*. This range of products reduces the risk of filter fires in the metalworking industry to a minimum. These products are designed to prevent fire and to minimise consequential damage in the unlikely event of a fire.

SHIELD products are divided into three categories: products to prevent fire, detect fire and suppress fire. Smoke, heat and sparks are detected at the earliest stages to minimise system damage and to avoid the fire from spreading and smoke from accumulating in the workshop.

Plymovent understands the causes that lead to filter fires. In response we have developed our fire safety system solution to control that risk. The SHIELD products can be combined into a customised solution and have been tested by Efectis¹ and the Dutch organisation KIWA².

¹ the European experts in fire safety.

² an independent organisation whose core business is highly qualified certification.

FIRE RISK INSIDE FILTRATION SYSTEMS

Fire is a serious risk and can occur unexpectedly inside filtration systems. Some welding and cutting applications have a higher risk than others to cause fire, due to such factors as higher temperatures, more sparks or lower flash points³. There are three key elements that cause and sustain a fire:

- **Fuel**, any combustible substance, can be a mixture of welding particulates and oil in the ductwork or inside the filter unit itself.
- The fan in the extraction system supplies fresh **oxygen** continuously, feeding the fire.
- **Heat**; sparks, smouldering or burning particles –such as *cigarette butts*– are potential sources of ignition. Spontaneous combustion can also occur.

HIGH-RISK WELDING APPLICATIONS

All welding and cutting applications represent a potential fire hazard⁴.

- **Robot welding of pressed, stamped or oily parts**, such as in the automotive industry, can generate welding fumes with a relatively low flash point³. These can be ignited by sparks or could spontaneously combust by sweltering⁵ in the dustbin.
- **Source extraction**, such as extraction arms, may be misused for cigarette fumes and used for dumping butts.
- **Manual, robotic and automatic welding of oily products** in general. The need for maintenance can be underestimated in oily applications. Here fires can occur not only at the time of installation, but also years later.
- **Cutting tables**; glowing materials from the cutting process create a potential risk of fire.

³ the lowest temperature at which a liquid produces enough vapours to constitute an ignitable mixture.

⁴ please note that this list is not exhaustive.

⁵ a chemical conversion process which generates heat and can cause spontaneous combustion.

ENGINEERED SOLUTION

The SHIELD programme contains several components that can be combined to create a system solution. Each product has its own unique features and benefits.

As every factory is different, Plymovent can specifically advise on how to control the fire risk in your workshop. We can design the system solution tailored to your welding applications and specific requirements.

1. PREVENTION

- **SparkShield**; this spark arrester prevents sparks, spatter and cigarette butts from entering the ductwork and reaching the filter cartridge(s) and debris in the dustbin.

- **OilShield** feeds limestone into the ductwork, where it mixes with oil/oily fumes, decreasing the combustibility of oil and preventing spontaneous combustion.

2. DETECTION

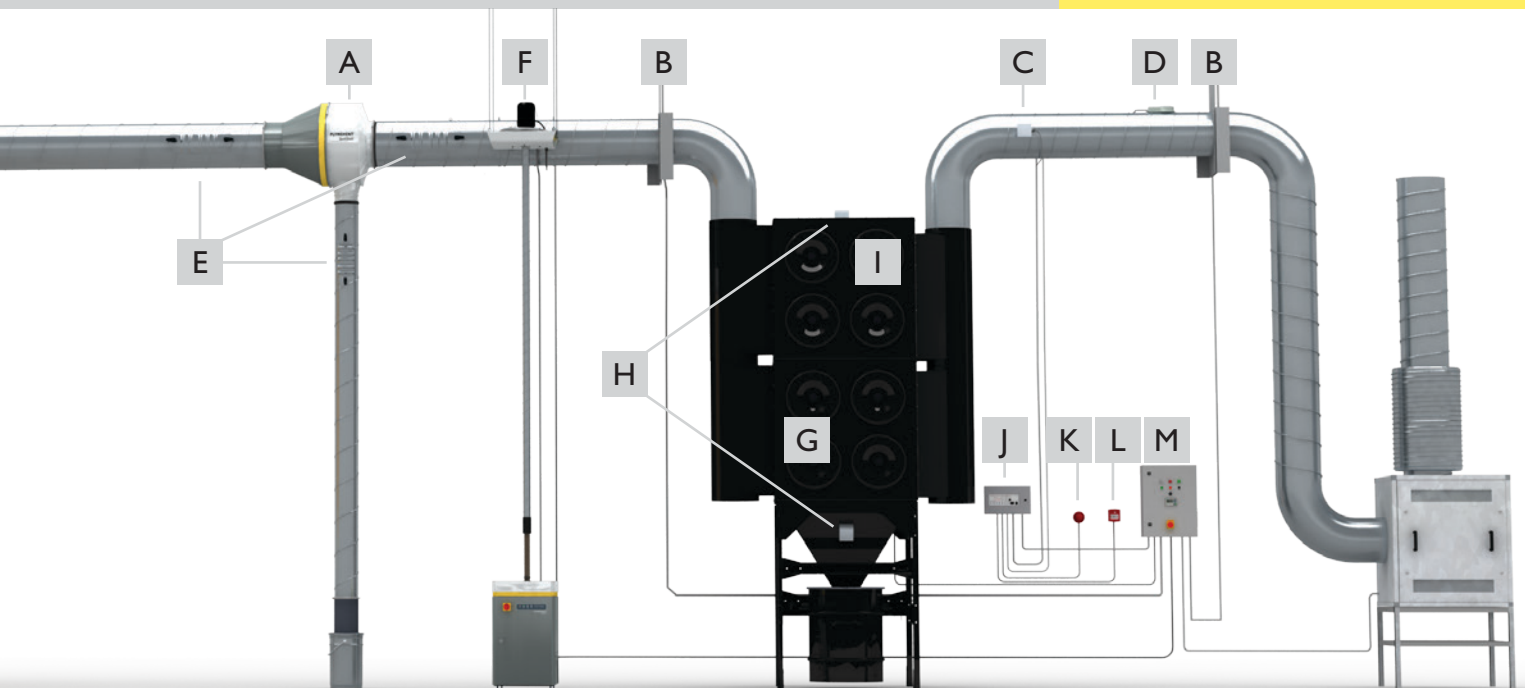
- **Detectors** ensure that heat, sparks and smoke are detected immediately.
- **ShieldControl** responds to the detectors within seconds and activates the suppression products.

3. SUPPRESSION

- **Sliding valves** stop the airflow and isolate the fire, reducing the consequential damage.
- **FlameShield**; this aerosol generator extinguishes the fire inside the filtration system.

FEATURES SHIELD FIRE SAFETY SOLUTIONS

- Reduce the risk of fire to a minimum.
- Detect possible fire starters quickly.
- Immediately suppress and extinguish any fires that start.
- Reduce system damage to a minimum.
- Minimise filter replacement and maintenance costs.
- Reduce production downtime in the event of a fire.
- Increase the effectiveness and lifespan of your entire extraction system.



SYSTEM OVERVIEW

- A. SparkShield (spark arrester)
- B. Sliding valve (2 pieces)
- C. Spark detector (set of 2)
- D. Smoke detector
- E. Inspection hatch (3 pieces)
- F. OilShield (limestone feeder)
- G. Solenoid valve (at the back of the MDB)
- H. Heat detector (set of 2)
- I. FlameShield (extinguisher inside the MDB)
- J. ShieldControl (fire detection panel)
- K. Acoustic fire alarm
- L. Manual call point
- M. System control panel

Sparks are well known as a potential ignition source leading to fires in the metalworking industry. Welding fume extraction systems without a specific spark arrester may allow sparks, spatter and dust to reach the filter cartridge(s) and debris in the dustbin. Plymovent developed SparkShield in order to prevent such fires.

SPARKSHIELD

SparkShield is a compact in-line spark arrester which requires little or no floor space. Its design is highly effective in the removal of sparks.

In addition, SparkShield is also very suitable as pre-separator for high-dust applications. Centrifugal acceleration removes many sparks from the continuous airflow. A dustbin collects all the remaining sparks at a safe distance from the main filter unit and away from the main ductwork. The dustbin can easily be removed and emptied, even during operating hours.

MAINTENANCE

Unfortunately, improper maintenance is one of the most common causes of fire in filtration systems. Spark arresters, like any other equipment, require maintenance.

Unlike competitors' products, SparkShield is designed with maintenance in mind. Inspection hatches can be placed around the spark arrester. The hatches make it possible for you to inspect the ductwork. You can determine whether cleaning is necessary.

The removable body is designed for easy maintenance. Because it is connected to the main ductwork with clamps it can easily be dismantled in sections.

Plymovent will be happy to advise you on service and maintenance frequency.



SPARKSHIELD FEATURES

- Highly effective removal of sparks and cigarette butts.
- Compact in-line design.
- Removable body for easy maintenance.
- Duct clamp connection for easy installation, service and dismantling.
- Optional hatches for regular inspections.



OILSHIELD

The Plymovent limestone feeder was developed for oily welding applications and for processes like machining where components are covered with punching oils or rust preventative.

Oily welding fumes are a potential fire risk. They can reduce the lifespan of your filter cartridges by clogging them. This may lead to high maintenance and replacement costs. OilShield® minimises that risk considerably.

OilShield is in fact a limestone dosing unit. The key characteristic of limestone is that it decreases the combustibility of oil, reducing the risk of fire.

HOW IT WORKS

The OilShield unit doses the limestone, and the booster fan on top extracts the limestone and transports it into the main ductwork. After the limestone has absorbed the oil from the welding fumes, the resulting mixture becomes easy to filter.

When cleaning –by reverse pulsing– takes place inside the filter unit, the mixture falls down into the dustbin below. This way, OilShield reduces the risk of fire not only inside the filtration system but also in the debris within the dustbin.

RELIABILITY

The high operational reliability of the OilShield is unique. The booster fan ensures that the limestone is always fed into the main ductwork according to the required settings. As soon as the supply of limestone is exhausted, a signal is activated to ensure that the responsible person nearby is immediately aware. Refilling the unit is maintenance-friendly, just open the top cover. Rim extraction prevents spills and dust when filling the unit with limestone.

As limestone has a tendency to clog, we have incorporated an anti-clog function to ensure continued operation. In addition, agitators within the hopper and feeder keep the limestone in constant motion to ensure steady and uninterrupted feeding.

OilShield offers unmatched durability and unrivalled performance reliability; we therefore highly recommend its use for oily applications in general and especially for those with a low flash point.

* patent pending.

OILSHIELD FEATURES

- Reduces the risk of fire in filtration systems.
- Reliable operation thanks to double agitator technology, booster fan, automatic start/stop and refill alarm.
- Prevents clogging of filter cartridges by oily fumes.
- Increases the lifespan of filter cartridges; reduces operational and maintenance costs.
- Integrated rim extraction prevents dust clouds and spills of limestone.
- Easy to install in new and existing systems.
- Anti-clog functionality.
- The controls can be incorporated in a system control panel.





ShieldControl

SHIELDCONTROL

ShieldControl is an important component of the entire detection programme. The connection cables to the detectors and the FlameShield extinguishing devices are monitored for open circuits and short circuits. In the event of a cable circuit failure, ShieldControl activates a warning signal.

ShieldControl includes a battery pack to ensure that in the event of a power failure the detectors remain operational and that the fire extinguishing devices are activated in the event of a fire.

This fire detection panel is compliant with European and UL standards*.

EARLY DETECTION

The detectors and the fire detection panel (ShieldControl) have been developed to detect a fire in its early stages.

Early detection –and the activation of the suppression products– reduces the consequential damage to your extraction and filtration system.

DAMAGE LIMITATION

If one of the fire detectors is activated, ShieldControl takes over.

- The fan is switched off automatically, stopping the supply of fresh air.
- The pneumatic sliding valves in the ductwork are closed immediately, isolating the fire.
- The compressed air supply (used for cleaning filter cartridges) is shut down.
- FlameShield, aerosol fire extinguishing generator, is activated.

The main goal of the detection equipment is to activate the suppression products as early as possible. This will isolate the fire and prevent any filter fire escalating into a large system fire, limiting any consequential damage.

* EN 54-2, EN 54-4, EN 12094-1 and UL 864.

WHAT DO WE DETECT?

In addition to prevention, you can also detect fires even at the earliest stages.

SHIELD detection equipment combines the detection of high temperatures, sparks (from an incipient fire) and smoke.

Fire detectors are placed inside the filter unit and within the main ductwork. They are designed to detect fire both whilst the system is in operation and also when it is switched off.



System Control Panel (SCP)

WAYS OF SUPPRESSION

The reliable detection equipment of the SHIELD programme quickly activates the suppression products, which are designed to suppress and extinguish any fire.

These products ensure that damage to the filtration system is kept to a minimum or eliminated completely. They minimise the risk of escalation and consequential damage by smoke.

The suppression products are sliding valves and aerosol fire extinguishing generators.



FlameShield

SLIDING VALVES

The main purpose of the sliding valves is to isolate the fire at an early stage by closing the sliding valves in the main ductwork. In the event of a fire –*less than five seconds after detection*– the fan is switched off, the filter cleaning system is shut down and the filter is isolated by the sliding valves. The fire is isolated, cut off from any source of oxygen or airflow. The fire is suppressed and goes out. The risks of escalation, more extensive system damage and smoke escaping into the workplace are kept to an absolute minimum.

FLAMESHIELD

FlameShield, the aerosol fire extinguishing generator, is activated seconds after the sliding valves are closed.

The ultra-fine aerosols interfere with the free radicals in the flames, extinguishing the fire rapidly. The aerosols remain active for at least 30 min. after activation, thus preventing re-ignition.

The fire extinguishing generator activates automatically at temperatures >300° C (572° F).

MAINTENANCE

The compact generators can easily be placed inside the filter unit and do not require extra air pressure or additional ductwork. Each generator has an (inactivated) service lifespan of ten years. Replacing a generator is easy.

As a sustainable company, Plymovent only uses the best materials available. The FlameShield aerosol is not harmful or toxic to people or the environment; it is ozone neutral.

A major benefit is that it does not damage electrical equipment, whereas other extinguishing media such as water destroy your equipment or other extinguishing agents are harmful if breathed in. This aerosol is safe for you, your employees and your equipment.

FLAMESHIELD FEATURES

- Effective fire suppression.
- Limit system damage.
- Low risk of a fire escalating.
- Low maintenance.
- Easy to install and replace.
- Environmentally friendly.
- Negligible residue and cleaning after activation.
- Safe for personnel and equipment.
- Activates automatically at >300° C (572° F).



Sliding valve and detectors

FIRE RISK UNDER CONTROL

Plymovent understands the causes of fire at different welding applications in the metalworking industry better than anyone. Our SHIELD programme, combined with our know-how and field experience, allows us to offer you a tailor-made solution that will keep fire risks under control.

The *SHIELD fire safety solutions* of Plymovent reduce the risk of fire to a minimum, and in the event of a fire, ensure that any consequential damage is minor.

The consequences of almost all incidences of fire will be limited, with little or no system damage and just the replacement of the filter cartridges and aerosol fire extinguishing generators.

The *SHIELD fire safety solutions* have been tested and certified by several institutes.

In addition to our *SHIELD fire safety solution*, we can also advise on service and preventive maintenance. For more information, please contact your Plymovent distributor or visit our website.



PLYMOVENT OFFERS TOTAL SOLUTIONS FOR AIR CLEANING

Plymovent *SHIELD fire safety solutions* is a total concept to prevent, detect and suppress fires in welding fume extraction and filtration systems. Modifications of existing filtration systems and/or larger filtration systems (not covered by the standard range of controls) can be provided specifically to meet your needs.

Plymovent offers complete solutions for air cleaning. We have 45 years of experience in the extraction and filtration of welding fumes, grinding dust and oil mist in the metalworking industry. We are also specialists in the extraction of vehicle exhaust fumes and the removal of other impurities from indoor air.

PLYMOVENT®

clean air at work

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We respect the environment and we deliver high-quality products. Our expertise gained over many years and our genuine commitment to customer requirements enable us to provide precisely the solutions you need.