



Guardian™ Fire Safety Solutions

*FIRE RISK CONTROL IN WELDING
FUME EXTRACTION SYSTEMS*

LINCOLN®
ELECTRIC

Guardian™ Fire Safety Solutions

FIRE RISK CONTROL IN WELDING
FUME EXTRACTION SYSTEMS



DO YOU CONTROL THE RISK OF FIRE AT THE WORKPLACE?

Lincoln Electric presents Guardian™ fire safety solutions for welding fume extraction and filtration systems. This range of products reduces the risk of filter fires in the metalworking industry. Early detection and suppression are initiated in the event of a fire, to minimize the fire hazard, limit system damage and avoid the risk of escalation and accumulation of smoke throughout your manufacturing environment.

We understand the causes that lead to filter fires and, in response, have developed a fire safety system to control that risk. The Guardian™ products are divided into three categories – products to prevent, detect and suppress fire. This allows for a tailor-made solution. The Guardian™ products have been tested by Efectis^{®1} and the Dutch organization KIWA^{®2}.

FIRE RISK IN FILTERS

Fire is a serious risk and may occur unexpectedly in fume extraction filters. Some welding and cutting applications have a higher risk of causing fires than others, due to such factors as the amount of oil or other flammable material on the work, high temperatures, excessive spatter or the low flash point of oil and other substances.

Three key elements can cause and maintain a fire:

- **Fuel** (a combustible substance) can be a mixture of particulates and oil in the ductwork or in the filter itself.
- The fan of the extraction system supplies fresh **oxygen** continuously, necessary to support a fire.
- **Heat:** Potential sources of ignition are sparks, smoldering or burning particles – such as cigarette butts – or spontaneous combustion.

HIGH RISK WELDING APPLICATIONS

All welding and cutting applications represent a potential fire hazard^{®3}.

- **Robotic welding of pressed, stamped or oily parts**, such as in the automotive industry – can produce welding fumes with a relatively low flash point^{®4}. These can be ignited by sparks or could spontaneously combust by sweltering^{®5} in a dustbin or collection location.
- **At source extraction**, such as fume extraction arms, which may be misused for cigarette fumes and butts.
- **Manual, robotic and automated welding of oily parts or products** in general. Maintenance can be underestimated in slightly oily applications, which can cause fires even years after installing the system.
- **Cutting tables** produce glowing materials from the cutting process that create a possible risk of fire.

A FIRE SAFETY ENGINEERED SOLUTION

The Guardian™ program contains several components which may be combined to create a system solution. Each product has its own unique features and benefits. As every factory and application is different, Lincoln Electric can help you select the systems suitable to control the fire risk in your fabrication operations. Lincoln Electric designs a system solution, tailored to your specific welding applications and requirements.

1. PREVENTION

- **Spark Guardian™:** This spark arrestor prevents sparks, spatter, and cigarette butts from entering the ductwork and reaching the combustible filter cartridge and debris in the dustbin or collection location.
- **Oil Guardian™:** This device feeds limestone into the ductwork, where it mixes with oils/oily fumes, decreasing the combustibility of the oil and preventing spontaneous combustion.

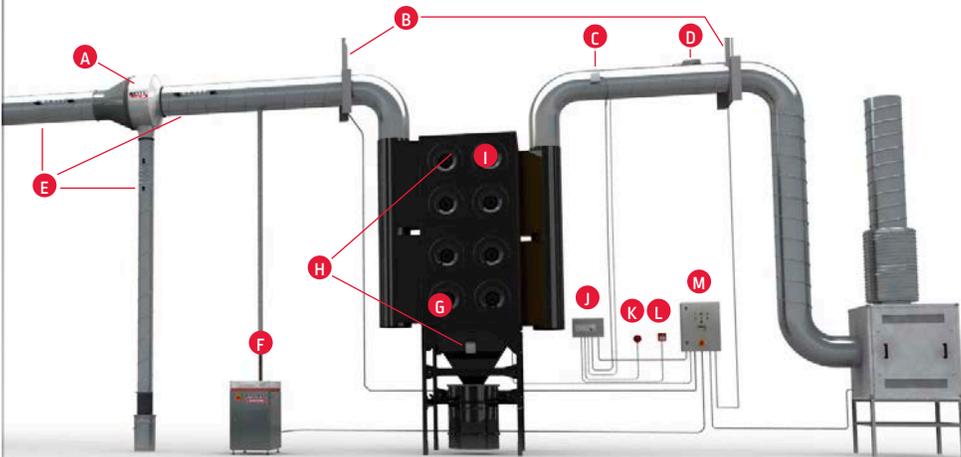
2. DETECTION

- **Detectors:** These ensure that sparks or a starting fire is noticed immediately.
- **Guardian Control™:** This responds to the detectors, activating the suppression system.

3. SUPPRESSION

- **Sliding valves:** These stop the flow of air and isolate the fire to reduce the external fire damage.
- **Flame Guardian™:** This aerosol generator extinguishes fires in the filter housing.

SYSTEM OVERVIEW



Shown: Complete central system with Guardian™ components installed.

- | | | |
|---|--|---|
| A. Spark Guardian™
(Spark arrestor) | F. Oil Guardian™
(Limestone feeder) | J. Guardian Control™
(Fire detection panel) |
| B. Sliding Valve
(2 pieces) | G. Solenoid Valve
(Backside of the Statiflex® filter bank) | K. Fire Alarm Sounder
(Automatic alarm point) |
| C. Spark Detector
(Set of 2) | H. Heat Detector
(Set of 2) | L. Manual Call Point
(Manual alarm point) |
| D. Smoke Detector | I. Flame Guardian™
(Inside the Statiflex® filter bank) | M. System Control Panel |
| E. Inspection Hatch
(3 pieces) | | |

FEATURES

GUARDIAN™ FIRE SAFETY SOLUTIONS

- ▶ Reduce the risk of fire to a minimum
- ▶ Detect possible fire starters
- ▶ Suppress the start of fires immediately
- ▶ Reduce system damage to a minimum
- ▶ Minimize replacement, maintenance and filter downtime in case of fire
- ▶ Increase the effectiveness and lifespan of your entire extraction system



Heat Detector

⁰¹ Efectis is a European expert in fire safety - Evaluation Guidelines: BRL-K23003 and BRL-K23001

⁰² KIWA is an independent organization whose core business is highly qualified certification - Evaluation Guidelines: BRL-K23003 and BRL-K23001

⁰³ This list is not exhaustive

⁰⁴ Flash point is the lowest temperature at which a liquid produces enough vapors to constitute an ignitable mixture.

⁰⁵ Swelting is a chemical conversion that produces heat and can cause spontaneous combustion.



Prevention

SPARK GUARDIAN™

Sparks are a well known potential ignition source of fire in the metalworking/fabrication industry. Extraction systems without a specific spark arrestor may allow sparks, spatter and dust to reach the combustible filter cartridge and debris in the dustbin or collection location. In order to control this potential fire hazard, Lincoln Electric offers the Spark Guardian™.

Spark Guardian™ is a compact, in-line spark arrestor which requires little to no floor space. The patent pending design of the Spark Guardian™ provides the ability to remove well-known ignition sources such as welding and grinding sparks and cigarette butts.

In addition, Spark Guardian™ is also very usable as a pre-separator for high-dust applications. Centrifugal acceleration removes most sparks from the continuous airflow. A dustbin collects all remaining sparks at a safe distance from the main filter and away from the main ductwork. The dustbin can easily be removed and particulate can be disposed of even during hours of operation.

MAINTENANCE

A prevalent risk factor in fume extraction filter fires is improper maintenance. A spark arrestor, just like any other piece of equipment, requires maintenance.

Unlike competitive products, Spark Guardian™ is designed with maintenance in mind. Optional inspection hatches can be placed in close proximity to it. These make it possible to inspect the ductwork and determine whether cleaning is necessary. The removable body is designed for easy maintenance. It can be dismantled into sections because it is connected to the main ductwork with clamps.

The manufacturer's instructions will advise you on service and maintenance frequency.

FEATURES

SPARK GUARDIAN™

- ▶ Highly effective in removing sparks and cigarette butts
- ▶ Patent pending, compact in-line design
- ▶ Removable body for easy maintenance
- ▶ Dust clamp connections for easy installation, service and dismantling
- ▶ Optional inspection hatches for regular inspection





OIL GUARDIAN™

In the metalworking/fabrication industry, welding may be carried out on components covered with punching or rust preventative oils. Oil Guardian™, Lincoln Electric's limestone feeder, is developed for those oily welding applications.

Oil Guardian™ is a limestone feeding unit that continuously injects limestone into the ductwork. Oily welding fumes are a serious risk of fire and can reduce filter life and cause increased maintenance costs. Oil Guardian™ minimizes the risk of fire in the filter cartridges and spontaneous fires in the dustbin. An additional benefit of limestone, as compared to alternative methods, is that it is very inexpensive.

EFFECTIVE LIMESTONE

The key characteristic of limestone is that it decreases the combustibility of the oil. The limestone absorbs the oily particulate and substances which reduces their concentration in the exhausted air. The mixed limestone and oil becomes dry matter, which when it reaches the filter, falls down into the dustbin during the cleaning cycle.

LONG FILTER SPAN

Oil Guardian™ protects the filter cartridges against premature clogging caused by oily fume and extends the cartridge lifespan considerably, reducing filter replacement costs. Oil Guardian™ can be installed in new or existing Lincoln Electric weld fume extraction systems⁽¹⁾.

RELIABILITY

The high operational reliability is unique. Oil Guardian™ features two agitators that keep the limestone in the hopper and feeder constantly in motion. The agitators are specifically developed and adapted to the characteristics of limestone. This technology ensures a steady and uninterrupted feed of the limestone.

Also, the unit automatically stops if it detects a change of pressure in the filter inlet. If limestone is running out, a refill detector connected to a local control or a warning light alerts the operator prior to the unit becoming empty. The integrated hatch extraction makes filling the hopper easy, without limestone 'clouds' escaping from the hopper.

The standalone unit can be integrated (or configured to communicate) with an existing control system through available circuits⁽¹⁾.

Oil Guardian™ offers the best of both worlds. It not only reduces the risks of fire, but it may also reduce filter maintenance costs when oily fume is present. We highly recommend Oil Guardian™ for applications using low flash point oils.

FEATURES

OIL GUARDIAN™

- ▶ Reduce the risk of fire in the filter and dustbin
- ▶ Reliable operation thanks to the double agitator technology, automatic controls and refill alarm
- ▶ Increase the lifespan of filter cartridges
- ▶ Reduce operational and maintenance costs
- ▶ Integrated hatch extraction prevents dust clouds
- ▶ Easy to install in new and existing systems⁽¹⁾
- ▶ Stand alone or integrate with existing Lincoln Electric Statiflex® filter bank weld fume control systems⁽¹⁾



⁽¹⁾ Conditions may apply to those systems that can be retrofitted with the Guardian® fire safety solution:

- ▶ It must be a Lincoln Electric system
- ▶ The system must be utilizing the Statiflex® Filter Bank filtration system
- ▶ The system must be reviewed and a revised engineering assessment and quotation must be provided

Detection

GUARDIAN CONTROL™

The Guardian Control™ is an important component of the detection program. This fire detection panel is compliant with European and UL standards¹⁰ and features an open or short circuit monitoring of the connection cables to the detectors and the Flame Guardian™ extinguishing devices. In the event of a cable circuit failure, Guardian Control™ activates a warning.

Guardian Control™ includes a battery pack to guard against power failure ensuring that the detectors remain operational and fire extinguishing devices get activated in case of fire.

EARLY DETECTION

The fire detectors and the Guardian Control™ fire detection panel are developed to detect a fire in the early phase. Early detection by a suppression system reduces damage to your filter system and the risk of fire to minimum.

LIMIT DAMAGE

If one of the fire detectors is activated, Guardian Control™ takes over:

- The fan is switched off automatically, stopping the supply of fresh air.
- The pneumatic sliding valves in the ductwork are closed immediately to isolate the fire.
- The compressed air supply (used for cleaning filter cartridges) is shut down and the cleaning cylinder is vented.
- Fire Guardian™ aerosol fire extinguishing generator is activated.

The main goal of all of these measures is to stop the supply of air. Without air, the expansion of fire is minimized. This prevents a larger fire from occurring and limits the subsequent damage.

WHAT DO WE DETECT?

In addition to prevention, the system can also detect the early signs of a fire. The system combines detection of high temperature, sparks (from a starting fire) and smoke.

Fire detectors are placed in the filter housing and ductwork behind the filter. They are designed to detect fire during system operation and when the system is turned off.



Guardian Control™

FEATURES

GUARDIAN CONTROL™

- ▶ Single point of control
- ▶ Sensors and line monitoring integrated into controls
- ▶ Monitoring, sensing and activation of temperature, spark and smoke sensors
- ▶ Battery back up against power failure



System Control Panel



Sliding Valve - open

Sliding Valve - closed

Suppression

SUPPRESSION METHODS

The detection equipment activates the Guardian™ suppression methods, including sliding valves and aerosol fire extinguishers, which are designed to suppress and extinguish a fire quickly and reliably.

The suppression methods ensure that damage to the filter is kept to a minimum or eliminated completely. They minimize the risk of a fire and the subsequent damage by the smoke.

SLIDING VALVES

The main purpose for the sliding valves is to isolate a fire early by closing the sliding valves in the ductwork. In the event of a fire, within 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 and cut off from the source of air. As a result, the fire will be extinguished. The risk of fire, system damage or smoke escaping into the work environment is kept to a minimum.

FLAME GUARDIAN™

Flame Guardian™, the aerosol fire extinguishing canister, is activated only seconds after the sliding valves are closed. The ultra-fine aerosol suppresses the fire.

The aerosol remains active for at least 30 minutes after activation, thus preventing the re-ignition of a fire. The aerosol fire extinguishing canister activates automatically at temperatures >572° F (300° C).

MAINTENANCE

The compact canisters can easily be placed inside the filter housing and do not require extra air pressure. The canisters are self-contained and do not require additional components. Replacement of the Flame Guardian™ canisters is easy, making maintenance a low labor item. Each canister has an non-activated lifespan of 10 years.

Flame Guardian™ aerosol is not harmful or toxic for people in the environment; it is ozone neutral. A major benefit is that the electrical equipment will not be damaged as a result. Other extinguishing methods, such as water, may damage or destroy equipment. Some other extinguishing agents may be harmful if inhaled (e.g. carbon dioxide and Halon gas).

FEATURES

FLAME GUARDIAN™

- ▶ Effective fire suppression
- ▶ Limit system damage
- ▶ Reduced risk of fire and subsequent damages
- ▶ Minimal maintenance
- ▶ Easy to install and replace
- ▶ Environmentally friendly
- ▶ Negligible residue and cleaning after activation
- ▶ Reduces risk of injury to workers or damage to equipment caused by fire
- ▶ Self activating > 572° F (300° C)



Flame Guardian™

LINCOLN ELECTRIC OFFERS TOTAL SOLUTIONS FOR WELD FUME CONTROL AND FIRE SAFETY

Lincoln Electric's fire safety solution is a total concept to prevent, detect and suppress fires in welding fume extraction and filtration systems. Modifications of existing weld fume control systems and/or larger filtration systems (not covered by the standard range of controls) can be provided specifically to meet your needs.

Lincoln Electric is knowledgeable in the assessment, engineering, installation and servicing and maintenance of weld fume control solutions. As a leader in weld fume control, we have the expertise to assist customers in the complete assessment and removal of welding fumes and grinding dust in the metalworking fabrication industry.



FIRE RISK UNDER CONTROL

Lincoln Electric understands welding and the causes of fires as a result of different welding applications in the metalworking/fabrication industry better than anyone. The Guardian™ solution, combined with our team of knowledgeable staff and application expertise, makes us the best choice to create a solution that will keep fire risks under control.

The Guardian™ fire safety solution, delivered by Lincoln Electric, reduces the risk of fire to a minimum. In the event of a fire, it helps ensure that resulting damage is minor. The occurrence and subsequent damage in most situations will be limited to no or minimal damage and the simple replacement of filter cartridges and aerosol fire extinguishing canisters.

The Guardian™ fire safety solutions have been tested and certified by multiple institutions, including Effectis[®] and the Dutch organization KIWA[®].



Shown: Complete central system with Guardian™ components installed.

[®]Effectis is a European expert in fire safety

[®]KIWA is an independent organization whose core business is highly qualified certification.

The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

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