



Your Trusted Partner for Welding Safety Solutions



LINCOLN[®]
ELECTRIC
THE WELDING EXPERTS[®]

Lincoln Electric



John C. Lincoln (above, top) founded The Lincoln Electric Company with a capital investment of \$200.

John's younger brother, James F. Lincoln (above, bottom), joined the company as a salesman in 1907.

LINCOLN ELECTRIC HAS SERVED THE WELDING INDUSTRY BY DELIVERING INDUSTRY LEADING WELDING AND CUTTING SOLUTIONS SINCE 1895. WE RECOGNIZE THE CHALLENGES YOU FACE REGARDING PRODUCTIVITY, QUALITY AND SAFETY AND WE STRIVE TO RESPOND TO THEM WITH INNOVATIVE AND DEPENDABLE SOLUTIONS.

Arc welding is a safe occupation when sufficient measures are taken to protect the welder from potential hazards. When these measures are overlooked or ignored, however, welders can encounter such dangers as electric shock, overexposure to fumes and gases, arc radiation, and fire and explosion; which may result in serious or even fatal injuries.

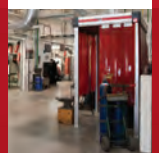
Welding Safety

Training is an essential part of any solution offered by Lincoln Electric. This practice is reinforced through operation of a world-class welding school at the Company's global

headquarters in Cleveland, Ohio where welding safety is a key focus. Posters, guides and interactive tools are utilized to enhance the welding safety component of all the Company's training programs. *(These items are made available to anyone in the industry at no charge).*

Lincoln Electric Technical Sales Representatives play an important role in disseminating these materials and working with customers at their locations to train and educate them on the proper usage of equipment. The message is clear; we want to provide you with complete solutions and work with you to ensure your team is satisfied and effectively using, operating and maintaining all Lincoln Electric products for a safe and productive work environment.

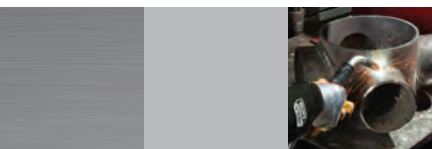




welding



protective apparel



Welding Gloves, Jackets and Caps

PROTECTIVE APPAREL

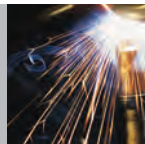
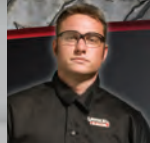
Welders must wear proper clothing to protect them from being burned. Red Line™ Welding Apparel product group from Lincoln Electric includes a variety of gloves, jackets, and caps.

Five types of welding gloves are available – premium leather MIG/stick, traditional MIG/stick, leather TIG, heat-resistant and full leather Steel Worker™ gloves. So whether it's MIG, TIG or stick welding, or working with hot or rusty metal, Red Line™ welding gear includes a set of gloves designed to handle the rigors of the task at hand.

Four Red Line™ jacket options effectively protect the arms and upper body. Each jacket offers flame retardant cloth panels to keep the welder cool, as well as heavy-duty leather panels in high spatter exposure, high wear areas. Customers can choose from flame retardant cloth, heavy duty leather or hybrid cloth/ leather jackets.

For wearing under the welding helmet, the Red Line™ product group includes doo rags, beanies and caps that stylishly and effectively protect the top of the head. Made from flame retardant material, they are comfortable, include athletic mesh lining for fast sweat evaporation and are machine washable.





Welding Safety Glasses and Welding Helmets

EYE PROTECTION

Always wear safety glasses with side shields or goggles to protect your eyes in the manufacturing and fabrication environment.

Lincoln Electric offers a full line of protective, stylish safety glasses. All eyewear meets the ANSI Z87.1+ and CSA Z94.3 standards and offers 99.9% UV-A, UV-B and UV-C protection. Indoor or outdoor, clear or mirrored...choose the style that is right for you!

When welding, always wear a welding helmet to protect against arc radiation. VIKING™ Auto-Darkening Welding Helmets are everything a welding helmet should be – lightweight, comfortable and full of features for every application. Choose the feature set you need and the style you want – there's a VIKING™ helmet that's right for you.



eye protection

welding fume control

The Lincoln Electric weld fume control team understands and recognizes that each welding application is unique with its own set of variables; there's not one equipment and consumable solution that fits every application. Likewise, every weld fume control application is unique. Our team will engineer a system to efficiently and effectively remove welding fume and particulate from your metalworking operations.

Our weld fume control product portfolio includes a broad range of equipment for the capture, extraction and filtration of welding fume and particulate. As our customers' needs and regulations change, we continuously evaluate and adjust and improve our product lines to meet those requirements.





Source Capture

Portable: Both high and low vacuum portable systems designed for the light-duty extraction and filtration of welding fume. They are a perfect choice for small shops or companies with few welding stations, yet lightweight and small enough to be easily carried to the welding area.

- Mobiflex® 100-NF (no filtration)
- Miniflex®
- X-Tractor® 1GC

Mobile: Moveable, rugged design, low vacuum filtration system designed for extraction and filtration of welding fume. Ideal for facilities that require welding fume extraction in multiple locations, including maintenance departments, general fabrication and job shops, and industrial welding environments.

- Mobiflex® 200-M
- Mobiflex® 400-MS

Fume Extraction Guns: Magnum® PRO fume guns are designed to stand up to high productivity fabrication and production environments. For high amperage semiautomatic welding where long hours of arc time are the norm, choose Magnum® PRO.

- Magnum® PRO for MIG (GMAW) and flux-cored (FCAW-GS) semiautomatic welding applications.

Stationary: Wall mounted, low vacuum systems designed for extraction and filtration of welding fume. Ideal for a variety of facilities with fixed location work stations and little available floor space including general fabrication, job shops, welding schools, and maintenance departments.

- Statiflex® 200-M (single and dual arm units)
- Statiflex® 400-MS (single arm unit)

Extraction Arms: Flexible extraction arms from Lincoln Electric are rugged and reliable. Each arm comes equipped with the 360° rotatable hood for proper positioning to the welding point. A variety of arm lengths are available, including a telescopic models.

- LFA 3.1 – 10 ft. (3.1 m)
- LFA 4.1 and LFA 4.1-LC – 13 ft. (4.1 m)
- LFA 2.0 – 6.5 ft. (2.0 m)
- LTA 2.0 – 3 to 4.5 ft. (1.0 to 1.5 m)
- LTA 2.0-CW



welding fume control



Source Capture

Central Systems

- **High Vacuum Central Systems For Welding, Cutting and Grinding:**
High vacuum central systems are a cost effective choice. These systems use a central turbine and filter, and supply suction throughout the plant. Since the airflow is one-tenth the volume of low vacuum systems, and the vacuum pressures are ten times higher, these systems use smaller ductwork and less CFM. Header ducts are frequently one size through the whole system.
- **Low Vacuum Central Systems For Schools and Industry:**
Lincoln Electric offers low vacuum exhaust systems for source capture applications. They are an ideal solution to address welding fume removal in educational environments and manufacturing plants that require multiple station drops. Systems can include arms, hoods, and downdraft tables, all operated from one central fan and filter.

Downdraft: The Lincoln Electric DownFlex™ downdraft table is a dual purpose work bench and extraction unit, designed specifically for the removal of welding fume at the source. It can also be used to remove particulate and dust from metal grinding applications, as well as fume and particulate from light duty plasma arc cutting.

- DownFlex™ 100-NF (no filtration)
- DownFlex™ 200-M
- DownFlex™ 400-MS/A





Local Extraction

Modular Extraction Hoods: Weld fume control and filtration in a flexible, attractive package. The Lincoln Electric Modular Extraction Hood is engineered to contain and extract welding, cutting, arc gouging, and grinding fume from the work environment. Its innovative design brings a reliable and practical solution to the market. These units are ideal for robotic, hard automation and manual applications.

Robotic Extraction Hoods: Lincoln Electric Automation extraction hoods are the ideal solution for welding fume extraction on robotic cells. There's a model for each of our pre-engineered cells or one can be customized to fit a non-standard cell. Available options for extraction hoods include interior lighting.



General Ventilation

Circulator: The Lincoln Electric Circulator™ System is a smart solution for welding safety, workplace cleanliness and an overall positive manufacturing work environment. It is designed to improve indoor air quality in smaller shops or work areas. The system handles this task by continuously moving cleaner, filtered air into the facility, preventing the formation of a welding fume layer in the ceiling and/or rafters.

Push/Pull: Fume and metal particulate from metalworking operations such as welding, plasma cutting, arc gouging and grinding can build-up as a layer in the air of a facility. Eventually, the particulate may settle back to the floor. Lincoln Electric Automation's Push/Pull System can remove this layer in a controlled manner, filter it and circulate the filtered air back into the facility.



Use a Push/Pull System when:

- Workers are in spaces where effective source capture is difficult.
- Fabricating large weldments where the welder needs to frequently shift positions.
- Improvement of general workplace air quality by removing welding particulate layer is desired.

Please note – A Push/Pull System cannot replace or control exposure at individual work areas. They are for improvement of general air quality in the facility.



building awareness

BUILDING AWARENESS AND ACTING AS A RESOURCE

Regulatory agencies and government bodies continue to put in place regulations to keep the worker safe in the workplace and better protect the environment. Lincoln Electric reviews these changes and actively provides details as they pertain to the welding and cutting industry. Awareness campaigns related to two regulations were launched to ensure manufacturers were conscious and knowledgeable, but also knew where and how to find resources and information to become properly prepared.

OSHA Hexavalent Chromium Standard:

Engineering controls must be implemented as of May 31, 2010

On February 28, 2006, the Occupational Safety & Health Administration (OSHA) issued a new standard relating to occupational exposure to hexavalent chromium, also known as Cr(VI).

What is Hexavalent Chromium?

Chromium is a natural metal that may be used in a wide variety of industrial activities, including the manufacture of stainless steel, arc welding, painting and pigment application, electroplating, and other surface coating processes. OSHA determined that the new standard is necessary to reduce health risks posed by occupational exposure to a specific, man-made form of chromium, Cr(VI).

What is the OSHA Standard for Hexavalent Chromium?

The standard lowers OSHA's permissible exposure limit (PEL) for hexavalent chromium, and for all Cr(VI) compounds, to 5 micrograms of Cr(VI) per cubic meter of air as an 8-hour time-weighted average (this amount is the same as .005 milligrams per cubic meter). The new PEL is one-tenth of the previous PEL.

To Which Industries Does This Standard Apply?

The standard covers occupational exposure to hexavalent chromium in general industry, construction and shipyards. Cr(VI) regulations have been issued for each industry (1910.1026, General Industry; 1926.1126, Construction; 1915.1026, Shipyards).

What Are The Requirements Of The Standard?

The new standard requires industries to control worker exposures to Cr(VI) so the new PEL is not exceeded. This may be done through engineering and work practice controls or through the use of respirators (only when controls are not sufficient). Other requirements include worker Cr(VI) exposure determinations, protective work clothing and equipment, house keeping, medical surveillance and communication of hazards and training.





EPA Metal Fabrication Hazardous Air Pollutants Rule:

40 CFR Part 63 Subpart XXXXXX. Promulgated July 23, 2008

What is a MFHAP?

Metal Fabrication Hazardous Air Pollutants (MFHAP) means any compound of the following metals:

- Cadmium
- Chromium
- Lead
- Manganese
- Nickel
- or any of these metals in the elemental form, with the exception of lead.

Is My Facility Subject To The Regulation?

This regulation applies to companies in certain industries that use materials containing MFHAP. Any material that contains cadmium, chromium, lead, or nickel in amounts greater than or equal to 0.1 percent by weight (as the metal) or contains manganese in amounts greater than or equal to 1.0 percent by weight (as the metal), as shown in formulation data provided by the manufacturer or supplier, such as the Material Safety Data Sheet (MSDS) for the material, is considered to be a material containing MFHAP.

You are subject to this subpart if you own or operate an area source that is primarily engaged in the operations in one of the nine source categories listed below. “*Primarily engaged*” is defined as the manufacturing, fabricating, or forging of one or more products listed in one of the nine metal fabrication and finishing source categories listed below where this production represents at least 50 percent of the production at a facility, and where production quantities are established by the volume, linear foot, square foot, or other value suited to the specific industry. The period used to determine production should be the previous continuous 12 months of operation.

Nine Affected Source Categories:

1. Electrical and Electronic Equipment Finishing Operations;
2. Fabricated Metal Products;
3. Fabricated Plate Work (Boiler Shops);
4. Fabricated Structural Metal Manufacturing;
5. Heating Equipment, except Electric;
6. Industrial Machinery and Equipment Finishing Operations;
7. Iron and Steel Forging;
8. Primary Metal Products Manufacturing; and
9. Valves and Pipe Fittings.

What Are My Compliance Dates?

If you are the owner or operator of an area source in one of the nine metal fabrication and finishing source categories, you must submit the Initial Notification for a new affected source no later than 120 days after initial startup. For an existing affected source, you must submit the Initial Notification no later than *July 25, 2011*.

If you are the owner or operator of an existing affected source, you must submit a notification of compliance status on or before *November 22, 2011*. If you are the owner or operator of a new affected source, you must submit a notification of compliance status within 120 days after initial startup.

welding fume methodology

Welding Fume Methodology – Steps to the Right Solution

Lincoln Electric follows an in-depth process of evaluating the right weld fume control solution for your application. Our technical sales team is trained and knowledgeable about the methodology of substitution, isolation, and ventilation. Lincoln Electric knows welding. As a key partner, with a wealth of experience and knowledge of welding, welding fume and welding fume removal, we can aid you in this process, more so than vendors with a focus only on air handling.

A crucial step is to conduct a site assessment and complete an application data sheet to ensure that the system design is appropriate to your particular facility's needs. Criteria including, but not limited to, amount of consumables used, welding processes, number of welders, type of parts and base material are essential data for ensuring your system is sized properly and accommodates all of your weld fume control and plant needs.

Regulatory Assessment: Have you determined the potential employee exposure to the welding fume constituent(s) from the welding consumable, base material and coating?

- Employee exposure assessment by a certified industrial hygienist

Exposure Determination: Is there any potential employee exposure to a welding fume constituent(s) above the applicable exposure limits (e.g. OSHA PEL or ACGIH TLV)?

- Employer periodic assessment by a certified industrial hygienist

ENGINEERING CONTROLS

Substitution: Is it feasible and practical to modify or replace your current welding process, consumable, gas, welding procedure or equipment technology with an alternative process, consumable, gas, welding procedure or equipment technology that generates less welding fume?

- a. Process
- b. Consumable
- c. Gas
- d. Procedure
- e. Advanced Welding Technology

Isolation: Is it feasible and practical to isolate and separate your welding operation by moving it to a regulated area, by automating/ventilating the welding process and/or by placing a barrier between the employee and the source?

- a. Automate and Ventilate
- b. Regulated Work Area





Ventilation: Is it feasible and practical to control the welding fume path between the source and the worker through source, local and/or general shop extraction/ventilation equipment?

- a. Source Extraction
- b. Local Exhaust Ventilation
- c. General Shop Extraction and Ventilation

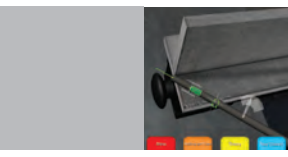
SAFE WORK PRACTICES

Safe work practices complement each level of Engineering Controls and are designed to control the manner in which work is performed. These practices include such areas as safe welding habits (keeping your head out of the fumes, keeping fumes and gases away from your breathing zone and proper training and use of fume extraction equipment) as well as housekeeping, maintenance and general administrative procedures such as scheduling operations/tasks at a time to minimize potential exposure.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

An important method of protecting employees in situations in which the above controls are not sufficient is the use of PPE, including respirators. However, employers are required to establish a respirator program in compliance with OSHA's respirator standard, which requires an initial employee medical evaluation, more frequent evaluation of worker exposure levels, training and recordkeeping. In addition, the OSHA PPE evaluation may determine the need for additional personal protection practices, including specific requirements for additional work clothing and equipment, as well as the need for a separate change room, shower and laundering service¹.

¹ May be required by OSHA regulations. For example: Chromium: 29CFR1910.10269(h), Cadmium: 29CFR1910.1027(i)

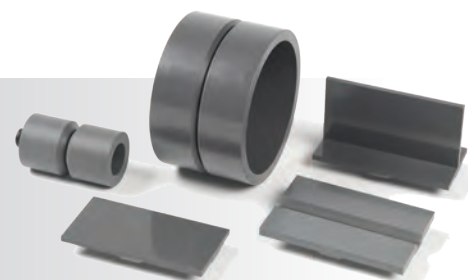


Virtual Reality Arc Welding Trainer is the Perfect Way to Reduce Emissions

The VRTEX[®] 360 is a virtual reality arc welding trainer from Lincoln Electric. This computer-based training system is an educational tool designed to allow students to practice their welding technique in a simulated environment. It promotes the efficient transfer of welding skills to the welding booth while reducing material waste associated with traditional welding training. The combination of realistic puddle simulation and arc welding sound tied to

the welder's movement provides a realistic and exciting, hands-on training experience.

Utilizing the VRTEX[®] 360 can help turn your welding training program green by cutting waste in base materials, welding consumables, and shielding gas, saving energy and reducing emissions.



For additional information, visit www.VRTEX360.com

complete solutions

COMPLETE SOLUTIONS THAT WORK.

The following are actual case studies that illustrate the potential benefits of well-designed, high-quality welding and weld fume control systems. They are provided for information only — actual results vary from one application to another.

Industry:

WAGNER- MEINERT

Challenge:

- Increase productivity
- Capture and filter welding fume
- Reduce heating costs

Solution:

Based on an on-site demonstration and training on the Pulsed MIG process, Lincoln Electric's POWER MIG® 300 (current model is POWER MIG® 350MP) and SuperArc® and Blue Max® MIG wires were selected to increase travel speeds.

To capture and filter welding fumes, two dual-arm Statiflex® 200-M wall-mounted filtration packages and four single-arm packages were installed.

Results:

A 143% increase in productivity from 2002-2005 was achieved by switching to Pulsed MIG.

A 42% reduction in average cost to heat the facility from 2002-2005 was achieved by filtering welding fume via the Statiflex® 200-M versus exhausting to the outside. This feat was accomplished despite the fact that Wagner-Meinert more than doubled their facility's size while the cost of natural gas itself increased 190%.

“This fab shop is the future of our business, and Lincoln understands the importance of providing the right tools to stay competitive.”

— Doug Zollinger,
Vice President Operations, Wagner-Meinert, Inc.





“We truly believe in employee involvement in safety because they’re the ones out there on the floor. Their opinion matters. People feel better about the work environment and are performing better now that the area is cleaner.”

— David Strebel,
Safety Manager, Elgin Sweeper



ELGIN SWEEPER

Challenge:

Upgrade weld fume extraction capabilities in the Elgin Sweeper Company’s high-volume chassis welding area to meet the OSHA Hexavalent Chromium Standard effective as of May 31, 2010.

Solution:

Custom engineered Push/Pull ventilation and filtration system from Lincoln Electric. Mobiflex® 200-M mobile welding systems for work areas.

Results:

After 60 days of operation, roughly 15 gallons of particulate was removed from the air. It is estimated that 140 gallons will be removed on a yearly basis.



complete solutions

Schools and Education:

ERIE INSTITUTE OF TECHNOLOGY (EIT)

Challenge:

Equip a new 50,000 square-foot training facility with the latest and highest quality welding and weld fume control technology.

Solution:

A variety of Lincoln Electric wire feeder welders, multi-process welder and wire feeder packages, TIG welders and a plasma cutting system were selected.

15-booth Lincoln Electric low vacuum central system for weld fume control.

Results

Easy-to-position extraction arm offers nearly 100 percent capture of weld fume in each welding booth.

Low vacuum central system is quieter than other types of weld fume control making it easier for instructors to talk with students and evaluate their welding technique by listening to the arc sound.

LANSING COMMUNITY COLLEGE (LCC)

Challenge:

Meet the increasing demands for highly skilled welders and accommodate rising enrollment at the school.

Solution

Construct a 9,000 square-foot welding lab outfitted with a variety of Stick, TIG, MIG and multi-process welders from Lincoln Electric. Incorporate three separate Lincoln Electric weld fume control systems.

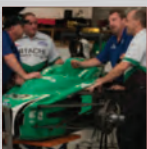
Results

LCC now has one of the country's leading welding programs.

LCC's welding lab includes 43 fully equipped booths, 14 oxy stations, four cutting stations and two plasma cutters.

“We would be hard-pressed to stay current without the support of Lincoln Electric. They’ve helped us build a great program, which has allowed us establish Lansing Community College as one of the top schools in the country.”

— *Denny Morse,*
Dean of LCC Technical Careers Division.





ILLINOIS VALLEY COMMUNITY COLLEGE (IVCC)

Challenge:

Implement a curriculum and equipment for stick, TIG and MIG welding that could support 15-20 students at a time.

The program called for extensive arc welding safety and instruction, hands-on plasma cutting and oxy-fuel brazing, as well as appropriate ventilation and welding fume extraction.

Solution:

Lincoln Electric and IVCC worked closely together to develop the proper equipment bid specification and mix including a 20-station centralized weld fume control system.

IVCC also utilized Lincoln's *No Teacher Left Behind™* training program to develop their curriculum.

Results:

In addition to welding equipment, consumables, and welding curriculum, Lincoln Electric supplied a state-of-the-art weld fume control system.

IVCC even ended up meeting all of the requirements for a substantial grant from the Illinois Safety Fund, covering the cost of the weld fume control equipment and hardware.

IVCC continues to receive support from Lincoln Electric on welding equipment, consumables, and environmental central systems.



“With Lincoln’s state-of-the-art equipment, we can be sure that the training IVCC is providing at this facility will serve both student and industry well into the future”

— Kathy Glascock,
Vice President of Technical Education at IVCC.



You Can Count On Us

24-Hour Support:

Our service and support does not end at 5:00 pm ET. We provide 24/7 access to our team to answer questions or concerns:

DAY: 1-888-935-3878, PRESS 4
AFTER HOURS: 1-888-532-8001
EMAIL: weldfumecontrol@lincolnelectric.com
ONLINE RESOURCES: www.lincolnweldfumecontrol.com

On-Going Support and Training Programs and Materials:

Lincoln Electric never stops. We will continue to offer support materials, training tools, free seminars and courses to enhance your welding and cutting safety program.

Our team will review and provide information on recommendations, changes and regulatory data pertinent to your operations and will have qualified staff to act as resources and answer questions.

Our service and support programs are designed to meet your needs. For on-going preventive maintenance and support, our team can train your staff or conduct evaluations, audits and the services you need to stay productive and effective.

A Warranty without the Fine Print:

The Lincoln Electric warranty does not tie you to a contract and you do not need to call us for details. The one warranty is the same for all products and is backed by a team of experts that work to ensure you are satisfied with your solution.

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.

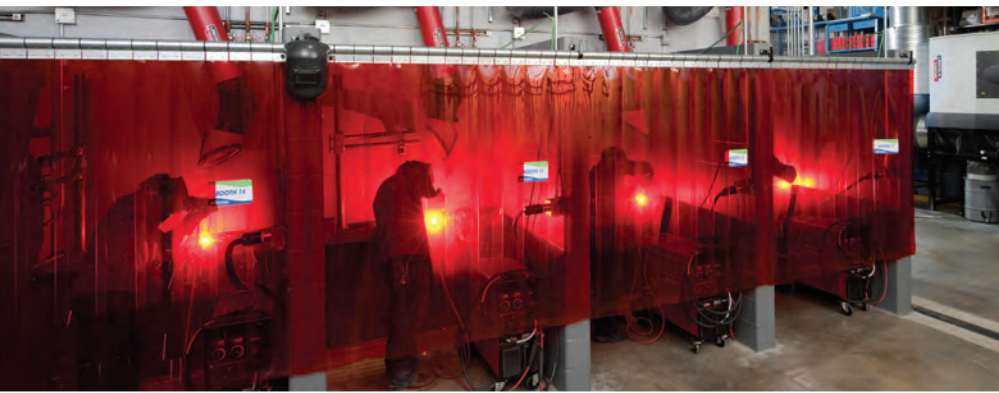
Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these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

Please Note – 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.







**The Lincoln Electric Company
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www.lincolnelectric.com/automated-solutions

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