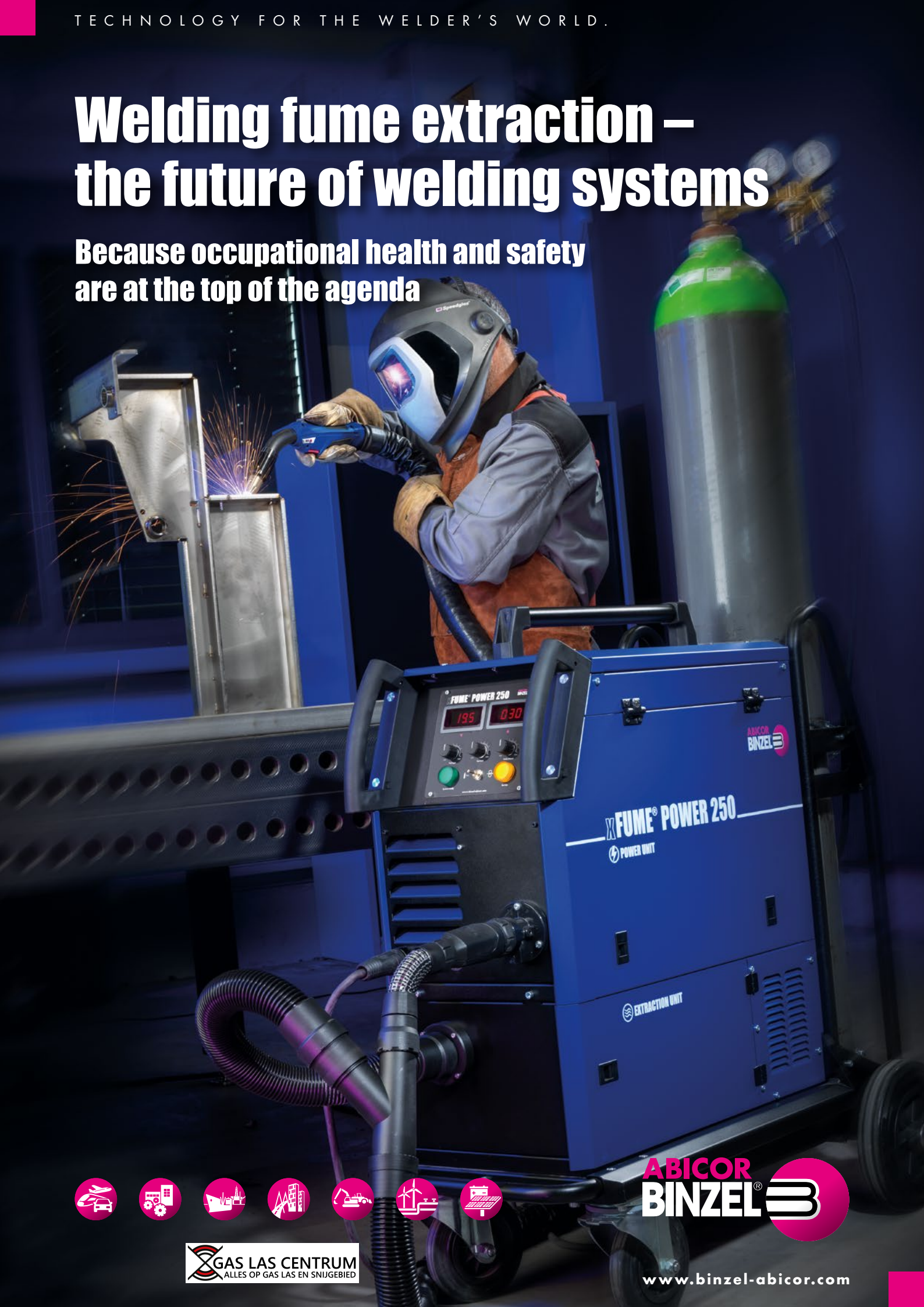
Welding fume extraction – the future of welding systems

Because occupational health and safety are at the top of the agenda



ABICOR BINZEL®

GAS LAS CENTRUM
ALLES OP GAS LAS EN SNIJGEBIED

www.binzel-abicor.com

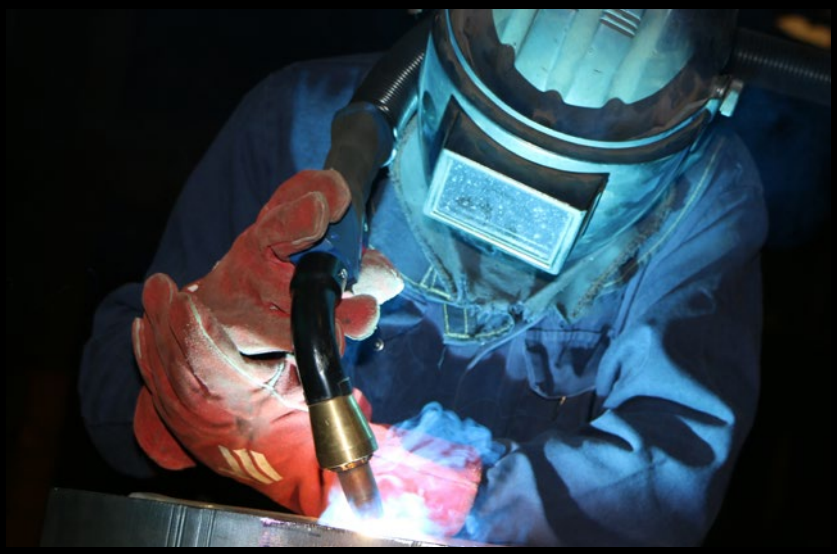
Welding fume extraction – the future of welding systems

Because occupational health and safety are at the top of the agenda

Harmful fumes, heavy torch systems, welding in forced positions – welders are exposed to a variety of strains every day. Fortunately, increasing automation already provides valuable support for monotonous welding work. Nevertheless, manufacturers of welding technology – including power sources – are still required to incorporate holistic workplace health and safety into the implementation of new product developments. Above all, protection against inhaling health-endangering fumes from the welding process, whether in manual or automated welding – and ideally with simultaneous relief for the musculoskeletal system.

The range of welding fume extraction systems on the market is very extensive. It is often difficult to find a suitable system for your own requirements.

This brochure provides an overview of the extraction technology product range of ABICOR BINZEL – your system supplier for all welding tasks with fume extraction.



Important features for fume extraction systems

There are a variety of features that make up a fume extraction system and are crucial for selection. Low vacuum system, high vacuum system, extraction at the source, filter capacity, flow pattern, power requirement, W3 approval ... at first glance, the points to be considered tend to create more confusion than clarity, and we want to resolve that. Below you will find the essential features for selecting a suitable fume extraction system:

- Vacuum type
- Power requirement
- Filter efficiency and classification
- Filter cleaning
- Mobility
- Number of torch connections
- System properties

Vacuum types & power requirement

Low vacuum system vs. high vacuum system

Most manufacturing companies are already equipped with stationary extraction systems. These are either located on the hall ceiling to completely filter the exhaust air of the entire room and replace it with fresh air or they absorb the fumes directly above the welding work-stations and convey them through a permanently installed pipe system into the extraction system. These so-called low vacuum systems absorb not only welding fumes, but also other pollutants from the environment. In systems of this type, a high volume flow rate flows at low negative pressure. The static pressure and the speed of the air are lower than with a high vacuum system and require the use of an extraction hood, which is usually not directly attached to the place of fume development – i.e. directly to the process – but is placed above it in most cases.

Efficient extraction through extraction at the source

High vacuum systems are far more efficient and thus healthier for the user, because they absorb the resulting welding fumes directly at their point of origin. This process is also called extraction at the source. A low volume flow rate flows at higher negative pressure through such high vacuum systems. The static pressure and the speed of the air are higher than with the low vacuum systems. There is still widespread concern that too much shielding gas could be extracted during extraction at the source. However, good fume extraction torches in combination with appropriate mobile extraction unit are designed to guarantee sufficient shielding gas coverage at all times.

VS.

Low vacuum system

High vacuum systems

Power requirements – from the needs of a small workshop to high-performance devices

For fume extraction systems, 1 kW single-phase output up to 8 kW three-phase ouput is usually sufficient. This covers the range of applications from small extraction units for workshop welding stations to large industrial high-performance devices.

Filter efficiency & classification

Particle filter classes & co.

There are different particle filter classes for the filters used, divided into the classifications E10 to E17, each according to DIN EN 1822-1. E10 to E12 are high-performance particle filters with a total separation efficiency of > 85 % to > 99.5 %. Local separation efficiency begins with H13 and H14 – so-called HEPA filters. They have a total separation efficiency of > 99.95 % to > 99.995 %. H-filters are not always necessary, depending on the task and the material to be welded. Depending on the material to be welded, there are differences in the classification of extraction unit filters.

W3 separation class

Some materials, such as chromium-nickel compounds, release harmful alveolar dusts during welding. These must be absorbed with a specially suitable filter with so-called W3 approval. Fume extraction systems with this classification can be used for welding all materials.

Fume classifications and their range of application

Filters are divided accordingly into so-called »fume classes«. These are described in the following table.

The **filter capacity** describes the size of the filter. A larger filter surface can also absorb more particles and thus has a high capacity. If filters can be cleaned automatically, this further increases their durability and therefore the service life.

Fume class	Degree of separation	Application
W1	**> 95 %**	Unalloyed steel, alloyed steel with alloying components, e.g. nickel and chromium, low alloy steel, x ≤ 5 %
W2	**> 98 %**	As W1, in addition alloyed steel with alloy components, e.g. nickel and chromium (5 % ≤ x ≤ 30 %)
W3	**> 99 %**	As W2, in addition alloyed steel with alloying components, e.g. nickel and chromium (high-alloy steel with x ≥ 30 % nickel-base alloys)

Mobility & system properties

Construction and performance

While stationary extraction systems are permanently installed and the component literally has to come to them, the great advantage of mobile welding fume extraction units is the possibility of flexible applications. The more compact and easier it is to move an extraction unit, the easier it is to transport it from A to B. It should be considered that the more extraction power a device offers, the heavier it becomes. If it is necessary to decide between efficient extraction performance or better mobility, the prescribed extraction capacity must in any case take precedence.

Depending on the welding workplace, space can be rather tight, thus an additional fume extraction unit besides the power source could be an obstacle. With the **xFUME® POWER 250**, ABICOR BINZEL has developed an air cooled power source with integrated welding fume extraction, which skilfully solves space problems with its slim design. There is more on this new and so far unique innovation in welding technology below.

Number of torch connections

Mobile extraction units are also available with multiple torch connectors. Whether one or more connections, both have their advantages and disadvantages. Welding fume extraction systems with a single torch connection can only be operated by a single welder. If the welder interrupt their work, the extraction unit stops as well. In many respects, this automatic start-stop system has a positive effect on various components of the extraction unit. For example, the service life of the motors, bearings, shafts and filters can be significantly extended. In addition, no electricity is consumed by running extraction units during the welding interruptions and the noise level in the workshop is reduced many times over.

Welding fume extraction systems with several torch connections are usually also larger and have a correspondingly larger filter, which is less maintenance-intensive. Self-cleaning filters also reduce maintenance costs. If several welding torches are connected, which may also have longer cable assemblies, special attention must be paid to the manufacturer's specifications, as the performance and quality differences are sometimes large.

System properties – added value for handling

Additional functions and system properties represent a real added value for the welder. A good mobile welding fume extraction unit should provide the following features:

Start-stop function

If the device is not in use, its function stops, it does not generate any noise and cannot wear out prematurely.

Automatic and manual filter cleaning

Whether completely autonomous filter cleaning or filter cleaning initiated by the welder – both filter cleaning functions use compressed air to blow the dust out of the filter. The particles are collected in a dust collection box and can be disposed of according to the specifications for the filter class and local waste regulations. This function extends the usability of a filter enormously.

Adjustable extraction capacity

If the extraction capacity of the device can be adjusted, this has a positive effect on the noise level as well as on energy consumption and wear.

xFUME® fume extraction technology from ABICOR BINZEL

Sophisticated fume extraction for small workshops up to applications in heavy industry

With the xFUME® series, ABICOR BINZEL offers holistic solutions for welders' occupational health and safety. Reliable welding fume extraction, weight reduction, the combination of power source and extraction unit, and even better handling and accessibility of the fume extraction torches are combined with more extraction efficiency, improved stability and maximum robustness. And all this with absolutely safe shielding gas coverage for the respective welding task.

Welding fume extraction efficiency high, weight low

Despite awareness that fumes are harmful to health and must not be inhaled by people in the immediate vicinity, fume extraction torches are not at the top of the popularity scale. The reason: due to their additional design with the extraction nozzle and the usually thicker cable assembly, most welding fume extraction torches appear heavy and unwieldy. In addition, they make it difficult to see the process without obstruction. Although welders are aware of the possible consequences of inhaling welding fumes, they tend to ignore this and prefer to use a standard MIG/MAG welding torch. With the xFUME® series, ABICOR BINZEL has developed welding fume extraction torches for extraction at the source that are unsurpassed in terms of weight, ergonomics and efficiency. They are strikingly slim in their complete design, allow a very good view of the welding process and all have **standard conformity with DIN EN ISO 21904**. Thus, all ABICOR BINZEL fume extraction torches meet the required extraction capacity standard – for MIG/MAG and TIG fume extraction torches.

The xFUME® fume extraction torches

High-end welding fume extraction as comfortable to hold as a standard welding torch

Safe and reliable extaction of welding fumes has never been easier and »healthier« than with the xFUME® series from ABICOR BINZEL. These welding fume extraction torches absorb welding fumes directly at the point of origin. This so-called extraction at the source is expressly recommended by the Hazardous Substances Regulations (GefStoffV) in DIN EN ISO 15012-1 – Annex I No. 2, »Particulate Hazardous Substances«:

»*Dusts must be detected as completely as possible at the point of origin or formation and disposed of safely. The extracted air must be managed in such a way that as little dust as possible enters the breathing air of the employees. The extracted air may only be returned to the working area if it has been sufficiently cleaned*«.

In combination with the welding fume extraction units from ABICOR BINZEL, particles absorbed by xFUME® fume extraction torches are filtered at the point of origin, collected and can be disposed of in accordance with local waste disposal regulations. The purified air is returned to the working area.

The advantages of the xFUME® fume extraction torches at a glance:

- Highest efficiency in extraction – more health protection is not possible
- Specified ergonomics and weight reduction – protects the musculoskeletal system in every posture
- Slim, compact front end – excellent visibility and accessibility
- Optimised shielding gas coverage – for every process/application
- Flow-optimised extraction – increases extraction efficiency and reduces sensitivity to contamination
- Ergonomically optimised handles in scope, shape and length especially for the requirements of welding with fume extraction – always the best »grip«
- Excellent balance from torch neck to cable assembly

xFUME® PRO:
The heavy-duty system for tough everyday industrial use

Performance meets ergonomics in the xFUME® PRO fume extraction torch. Highest stability, best extraction capacity, a flow-optimised interior design of the complete welding torch, including cable assembly and less weight, with optimised geometry and integrated ball joint and thus even better overall handling, make this torch ideal for use in tough industrial applications. The optionally short or long button and the perfectly balanced cable assembly to the torch neck bring additional relief. The leather sleeve protects the cable assembly and allows it to slide easily even over edges.

Power meets efficiency

The xFUME® PRO can demonstrate its full power and efficiency in combination with a welding fume extraction unit such as the xFUME® ADVANCED, or the unique combination solution xFUME® POWER 250 power source/extraction system from ABICOR BINZEL.

Wherever thick sheets are welded with high currents, this air cooled or liquid cooled welding fume extraction torch shows its potential. This makes it the perfect tool for healthy welding in the structural, heavy fabrication, shipyards & offshore and energy segments. With the xFUME® PRO, welding with high currents and integrated welding fume extraction is also fun! Welding almost as if it were without any extraction.

- +10 % more power
- –20 % less weight
- Significantly improved ergonomics
- Better accessibility and clarity
- Improved stability and robustness
- Flow-optimised interior design
- Reduced gas loss due to optimised front end
- Uses the same parts as the xFUME® series
- Optional short or long button
- Conforms to standard DIN EN ISO 21904

Technical data

Torch type	Cooling	CO_2	Mixed gases M21*	DC (%)	Wire-Ø (mm)	Volume flow m³/h	
		Rating (A)				Extraction nozzle	Connector
xFUME® PRO 24	air cooled	270	250	60	0.8–1.2	72	103.5
xFUME® PRO 36	air cooled	330	300	60	0.8–1.2	57	102
xFUME® PRO 501	liquid cooled	500	450	100	1.0–1.6	58	95

* according to DIN EN ISO 14175

xFUME® COMPACT:
The super lightweight torch for thin sheets

The xFUME® COMPACT fume extraction torch will quickly become a favourite tool when it comes to welding thin sheets and currents of up to 250 amperes are used. Weight, haptics and handling make it easy to forget that you have a welding fume extraction torch in your hand. The optionally short or long button additionally supports this feeling – while a leather covering tube not only protects the cable assembly, but also allows it to glide easily over edges.

Ideal system solution up to 250 amperes

The xFUME® ADVANCED fume extraction system or the unique xFUME® POWER 250 combination solution power source/extraction system from ABICOR BINZEL form the perfect duo for the lower to medium welding current range.

Whether manual reworking downstream from a robot production line in vehicle construction, light welding work in process finishing or minor repair or workshop work – its super-light, comfortable handling makes the xFUME® COMPACT a welcome, »healthy« all-rounder in general fabrication and transportation. Once you have tested welding fume extraction with the xFUME® COMPACT, you will never want another fume extraction torch for thin sheet metal processing.

- Approx. 1.1 kg handling weight
- Dimensions and weight as close as possible to standard MIG/MAG-torch
- Patented extraction nozzle
- Improved accessibility and clarity
- Easy maintenance due to component minimisation
- Improved ergonomics
- Reduced gas loss due to optimised front end
- Uses the same parts as the xFUME® series
- Conforms to DIN EN ISO 21904

Technical data

Torch type	Cooling	CO_2	Mixed gases M21 *	DC (%)	Wire-Ø (mm)	Volume flow m³/h	
			Rating (A)			Extraction nozzle	Connector
xFUME® COMPACT 25	air cooled	250	230	35	0.8–1.2	46	85

* according to DIN EN ISO 14175

xFUME® TIG:
The handy one for fine TIG welding work

Although TIG welding does not produce a similar amount of fumes compared to MIG/MAG welding, it does produce fumes that are particularly dangerous when inhaled. That is why it was very important to ABICOR BINZEL to develop a high-performance TIG torch for industrial use. The xFUME® TIG fume extraction torch also works according to the principle of extraction at the source and efficiently absorbs these highly hazardous fumes at their place of origin. This is provided by a combined ceramic protection and extraction nozzle, through which this TIG fume extraction torch with its slim front end guarantees an excellent view of the process.

Welding high-alloy steels safely

The TIG welding process is used in the welding of high-alloy steels or stainless steel alloys. These contain chromium (VI) compounds, which are known to be the cause of cancer of the respiratory tract. Aluminum is also often TIG welded. Aluminum alloys contain aluminum oxide, which in turn can cause aluminosis. In this case, the damaged part of the lungs simply gives up its function – a process that is irreversible. This fact requires an extraction system with W3 filter approval. ABICOR BINZEL offers W3 welding fume extraction units suitable for the xFUME® TIG fume extraction torch.

With its innovative concept and design, the xFUME® TIG is an excellent TIG fume extraction torch in general fabrication especially for welding stainless steels, aluminum alloys and high-alloy materials, where welding fumes that pose different health hazards are increasingly released.

- Novel innovation in the field of TIG torches
- Integrated fume extraction to protect the welder
- Dimensions and weight as close as possible to standard TIG torches
- Patented extraction nozzle
- High use of common parts due to ABITIG® wear part concept
- Improved ergonomics
- Reduced gas loss due to optimised front end

Technical data

Torch type	Cooling	Rating (A)		DC (%)	Electrode-Ø (mm)	Volume flow m³/h	
		DC	AC			Extraction nozzle	Connector
xFUME® TIG 150	air cooled	150	105	35	1.0–2.4	14.7	36.5
xFUME® TIG 260W	liquid cooled	260	185	100	1.0–3.2	14.7	26.2

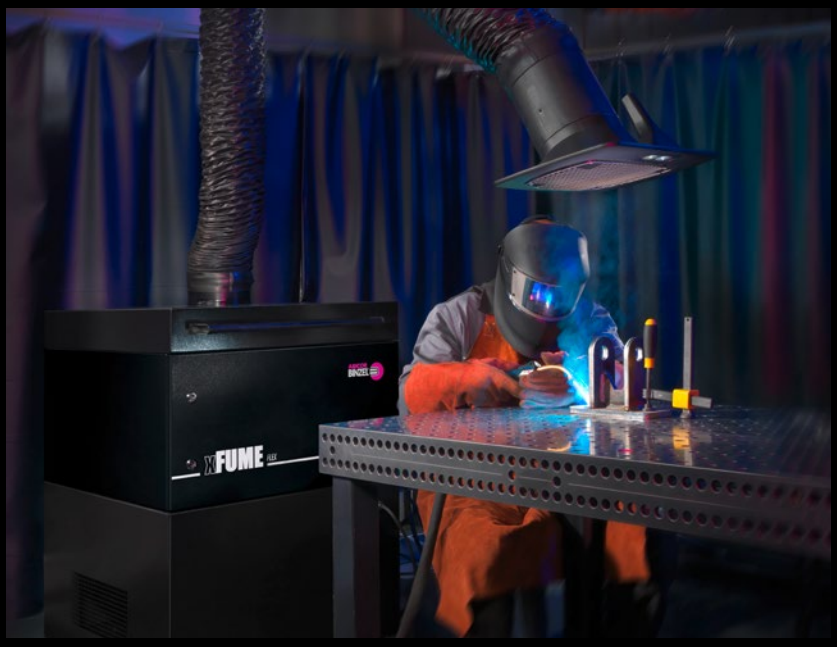
xFUME® fume extraction system

Mobile welding fume extraction that guarantees reliable health protection

The requirements for active occupational health and safety demand high-performance solutions for welding fume extraction. xFUME® fume extraction systems from ABICOR BINZEL efficiently absorb fumes and prevent them from spreading in the environment. They are designed for extraction at the source with a corresponding connected fume extraction torch, as well as for use with a standard MIG/MAG welding torch in combination with an extraction arm and funnel. Both extraction solutions work much more efficiently than stationary or central extraction systems.

The advantages of the xFUME® extraction systems at a glance:

- Highly efficient, powerful and reliable – help to comply with occupational exposure limits for alveoli dust (below 1.25 mg/m³, manganese below 0.5 mg/m³)
- Mobile – bringing health protection from one operation site to another
- Robust and durable – excellent for industrial use
- Simple – low-maintenance motor, easy to install, »plug & weld«



xFUME® ADVANCED:
The powerful one for extraction at the source

Technical data

Max. air flow:	~ 340 m^3/h
Connections:	2
Connection diameter:	60 mm
Max. vacuum:	~ 16,000 Pa
Noise level:	≤ 68 dB (A)
Voltage:	115 V, 50/60 Hz 230 V, 50/60 Hz
Motor power:	2 x 0.8 kW
Filter effectivity:	≥ 99.95 %
Cleaning:	Automatic
Automatic start/stop:	Yes
Adjustable airflow:	Yes
Weight:	40.0 kg
Dimensions:	370 x 370 x 940 mm

With this fume extraction system you are on the safe side in terms of occupational health and safety. The xFUME® ADVANCED is a powerful welding fume extraction system for use with a fume extraction torch. The used filter absorbs up to 99.95 % of all particles > 0.1 µm efficiently and reliably without affecting the shielding gas coverage. This extraction system can display all its skills in combination with an xFUME® COMPACT or xFUME® PRO fume extraction torch.

Easiest handling

Up to two extraction torches can be connected to the xFUME® ADVANCED, each of which can be controlled independently of the other. The high extraction capacity is guaranteed by two infinitely adjustable 0.8 kW motors with over 16,000 Pa. Filter cleaning is 100 % automated, which means that downtime due to cleaning intervals is eliminated.

If you want to establish extraction at the source in your production, the xFUME® ADVANCED together with an xFUME® fume extraction torch from ABICOR BINZEL is the perfect complete system for clean air at the welding workstation.

xFUME® ADVANCED at a glance:

- The filter detects up to 99.95 % of all dust particles > 0.1 µm
- Automatic, highly efficient filter cleaning saves time and provides security
- Automatic start-stop system reduces wear and keeps operating costs low
- Robust design and at the same time maximum mobility
- Two infinitely adjustable 0.8 kW motors for two welding workstations
- Slim design facilitates even hard-to-reach welding applications

xFUME® FLEX:
The all-rounder for welding fume extraction

Technical data

Max. air flow:	~ 1,200 m^3/h
Connections:	Extraction arm
Connection diameter:	–
Max. vacuum:	–
Noise level:	≤ 72 dB (A)
Voltage:	115 V, 50/60 Hz 230 V, 50/60 Hz
Motor power:	1.1 kW
Filter effectivity:	≥ 99.95 %
Cleaning:	No
Automatic start/stop:	No
Adjustable airflow:	No
Weight:	120.0–129.0 kg
Dimensions:	700x700x1,095 mm

This flexible, mobile and versatile extraction system ensures efficient welding fumes absorption at a manual welding workstation with standard torches. Simply place the extraction hood with the flexible extraction arm above the welding process and the xFUME® FLEX absorbs the fumes. The extraction hood function absorbs all forms of harmful particles from the ambient air, including micro particles from grinding and cutting work.

Easy start into welding fume extraction

The xFUME® FLEX extraction system is ideal for starting welding fume extraction, because existing welding torches can be used. A powerful LED working light is just as much a part of the standard equipment as the easily replaceable filter with an impressive filter surface of 36 m^2. This is therefore up to three times larger than the filter surfaces of standard extraction systems on the market. Thus, the filter has up to three times longer service life, which has a very positive effect on operating costs. If the extraction funnel of the xFUME® FLEX is positioned correctly, it absorbs up to 90 % of the fumes.

As a so-called LEV system – Local Exhaust Ventilation – the xFUME® FLEX is an inexpensive all-rounder extraction solution for MIG/MAG welding, TIG welding and plasma welding.

xFUME® FLEX at a glance:

- Ideal for getting started with extraction technology
- 3 times longer filter performance than standard extraction systems on the market
- Extraction arm in 2, 3 or 4 m lengths facilitates precise placement of the extraction hood
- Easy connection to 230 or 115 volt socket
- Optimal illumination of the workpiece with an LED work light
- Mobile design for easy transport between welding workstations

xFUME® POWER 250:
The clever combination system »power source plus extraction system«

Technical data

Output:	250 A
Wire diameter:	0.8–1.0 mm
Adjustment range:	30–250 A
Operating voltage:	13–30 V
Supply voltage:	400 V, 3 phase
Slow fuse:	32 A
Cooling:	Air cooled
Duty cycle:	35 %
Height (without trolley):	75 cm
Filter:	Disposable

Innovation and space-saving miracle are the two terms that best describe the new xFUME® POWER 250. ABICOR BINZEL is the first manufacturer of welding products to combine the power source and the extraction system for MIG/MAG welding in a single device with this unique all-in-one system solution. This sophisticated system solution eliminates the need for an additional extraction system for extraction at the source with a fume extraction torch.

The all-in-one solution

Perfectly coordinated and communicating modules enable high energy efficiency. If an air cooled xFUME® extraction torch from ABICOR BINZEL is connected, this is the beginning of perfect interaction. Particularly recommended are xFUME® fume extraction torches, which together with the xFUME® POWER 250 can quickly become the favourite system solutions of every welder.

Health protection made particularly easy!

xFUME® POWER 250 at a glance:

- Easily replaceable and durable filter box
- Saves separate fume extraction system, fewer parts to maintain
- Perfectly coordinated and communicating modules
- Fits under any workshop bench without a carriage
- Innovative combined system solution »power source + extraction system«
- Unprecedented optimal interaction of fume extraction torch, power source and extraction unit
- Unbeatable cost-effectiveness compared to power source plus extraction system

xFUME® ROBO extraction kit: The compact solution for extraction at the source on standard industrial robots or cobots

Complete set available in 3 and 6 m

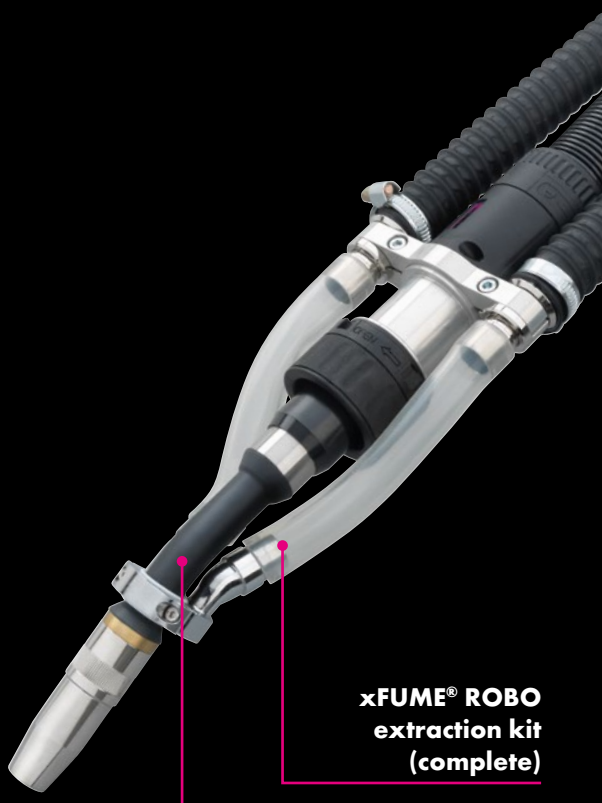
Liquid cooled
xFUME® ROBO W 500 22°
xFUME® ROBO W 500 45°
xFUME® ROBO W 600 22°
xFUME® ROBO W 600 45°

Air cooled
xFUME® ROBO A 500 22°
xFUME® ROBO A 500 45°

Extraction at the source is no less important where robot welding torches take over monotonous welding work or welding in forced positions. Robots or cobots have to be refit, maintenance work is required ... in all these activities, the door to the robot cell or the welding curtain is opened and the welding fumes enter the working environment. This must be avoided by all means! The xFUME® ROBO extraction kit prevents harmful welding fumes from spreading in the welding cell in the first place.

With the xFUME® ROBO extraction kit, ABICOR BINZEL offers a technically matured and compact solution for absorbing welding fumes at the place of origin. Each MIG/MAG robot torch can be easily upgraded with the xFUME® ROBO extraction kit. Adapter sleeves allow easy mounting of the kit to different torch neck diameters and compensate for variations. The two silicone extraction hoses can be dismantled without tools, which considerably simplifies maintenance.

Detection of the harmful welding fumes takes place behind the gas nozzle, which guarantees consistently good accessibility of the robot torch. The attachment of the extraction kit does not interfere even in confined positions and also provides consistently good access to the workpiece.



xFUME® ROBO extraction kit at a glance:

- Best possible detection of welding fumes with robot welding torches through extraction at the source
- Can be optimally retrofitted in existing systems
- Continues to allow good accessibility to the workpiece even in confined positions
- Highest possible occupational health and safety protection against welding fumes for employees in welding robot production
- Easy and tool-free maintenance
- Fits all extraction systems designed for robot welding

GAS LAS CENTRUM
ALLES OP GAS LAS EN SNIJGEBIED

ABICOR BINZEL®

MIX
Paper from responsible sources
FSC® C125689
www.fsc.org

Climate neutral
Print product
ClimatePartner.com/10347-1812-1001

Alexander Binzel Schweisstechnik GmbH & Co. KG
Kiesacker · 35418 Buseck · GERMANY
T +49 6408 / 59-0
F +49 6408 / 59-191
info@binzel-abicor.com

www.binzel-abicor.com

IBG GROUP

PRO.S057.EN • Bi-500.10.21 • Printed in Germany • © Copyright! • All trademarks named in this brochure are the property of the respective companies.