# Occupational health and safety by fume extraction during laser processing

## Eurolaser Polska utilizes air cleaning technology made in Germany

**A true success story … to be continued**

On the international market of laser processing systems, eurolaser is one of the best-known companies. Founded in 1994 by Dipl.-Ing. Matthias Kluczinski in Lüneburg/Germany, it was the founder's initial goal a to establish the laser technology for material processing within the industry and in the handcraft sector. This has been achieved, documented by continuous growth and a worldwide distribution and service structure.

In 2015, eurolaser Polska was integrated as an authorized partner of eurolaser GmbH, being responsible for sales and technical support for the vendor's laser systems in the territory of Poland.


*Image 1: The eurolaser Polska team in front of the company headquarters*

Today, eurolaser is one of the world's leading manufacturers of $CO_2$ laser machines for cutting, engraving, and marking. "Our powerful laser systems are designed for use in both craft work and industry. The modular construction with high-quality components guarantees

quality for the most demanding applications", explains Mariusz Deptuch, CEO of eurolaser Polska, located in Częstochowa, Southern Poland, halfway between the cities of Łódź and Katowice. In addition, eurolaser provides a wide range of production automatization solutions suited for different needs. With numerous options and additional tools, eurolaser systems are some of the most universal laser cutting systems available on the market, as the company proudly states.

Mariusz Deptuch continues: "The $CO^2$ laser represents the heart of our laser systems and crucially contributes to the efficiency and precision of the laser processing."
The sealed-off $CO^2$ laser used by eurolaser are long-lasting and maintenance-free, providing laser power of up to 600 W.
The wide-format laser cutter is dedicated for processing four groups of materials. These are:
- Acrylic (PMMA) and other plastics
- Wood
- Foils
- Textiles and technical textiles

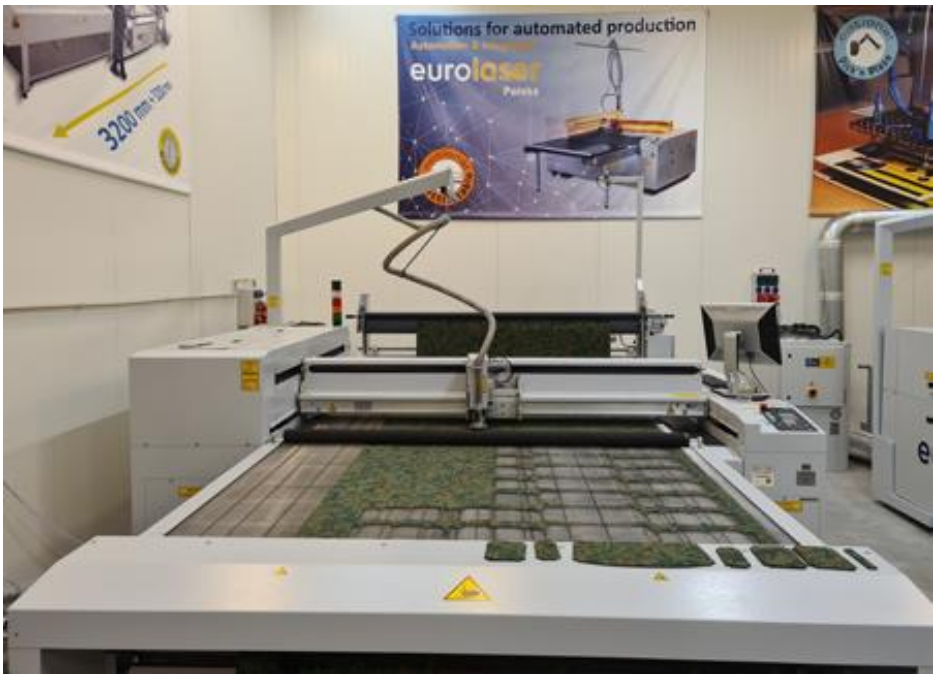

*Image 2: Laser processing of cordura - prototype production of military uniforms*

Eurolaser Polska's core competence is the distribution and sales of laser processing solutions to numerous customers in Poland. In parallel, the company provides application center services, such as
- Customer materials laser cutting test
- Laser cutting performance and quality test
- Prototype cutting
- Prototype production series
- Production support for present eurolaser customers

**Airborne pollutants and their removal**

It is well known in the industry that laser processing produces unwanted by-products such as laser fume and laser dust. The energy input during processing triggers pyrolytic and oxidation processes. They release a caustic, toxic mix of aerosols, gases, and nano particles. The latter are extremely hazardous, as during inhalation they overcome the lung-blood barrier and enter the nervous system. But it is not only about human health − machinery and products may also be Impacted or even damaged by laser fume that builds up firmly adhering layers of contamination.

That is why eurolaser decided to utilize a fume extraction system for air purification. More than 15 years ago, the company entered into a cooperation with ULT AG, vendor of air technology solutions, located in Löbau/Germany. It was therefore logical that eurolaser Polska continued this collaboration. Mariusz Deptuch says: “ULT is a long-standing technical partner of eurolaser GmbH, hence choosing ULT as a partner of eurolaser Polska was a natural and obvious step. Many years of knowledge and experience developed jointly by our partners is the best guarantee of the quality and functionality of the air filtration solutions we use for our laser systems.”

In 2020 – in the middle of Corona pandemic and with uncertain future prospects – eurolaser Polska decided to purchase the all-new laser fume extraction system LAS 800, today utilized with an eurolaser L-1200 200W conveyor laser system dedicated to cutting technical textile directly from role.

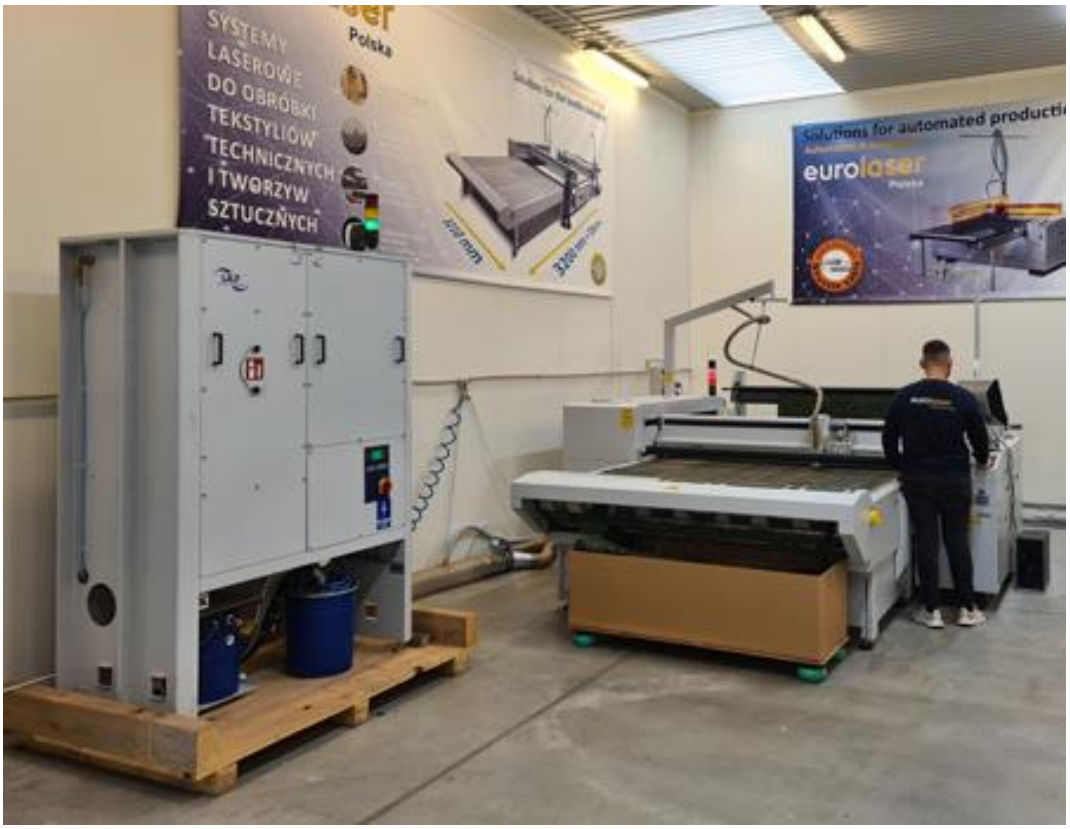


*Image 3: The LAS 800 laser fume extractor (left) purifies air from laser fume and dust*

“We were looking for very flexible laser fume filtration unit, because the range of different kinds of materials described as technical textile is very wide and depends on market sector. We are cutting different kinds of materials and their sandwich combinations which generates different types of laser emissions. Laser fume must be removed quickly and effectively so that it does not affect the contamination of the machine and product, and for the health of people operating the laser cutter,” explains Mariusz Deptuch.

**Laser processing tasks and their challenges for fume extraction**

Eurolaser Polska provides its solutions to various industries, such as automotive. In this sector there are applications for cutting nylon for airbags and spacers materials for seats systems. For upholstery applications eurolaser cuts materials like PE/PES/Foams in sandwich combinations.

“The most difficult application in this market sector is cutting different kinds of carpets where we have combinations or core material like ABS/PET with layers of foams or fibers,” say Mariusz Deptuch.

Additionally, a special task is cutting acoustic insulation materials with a thickness of more than 10 mm that generates a lot of laser fume where, without efficient filtration, smoke hinders the operation of lasers due to the rapid contamination of optics and mechanical parts of laser systems.

Another separate challenge is to be found in services for the military industry, where the most common use of lasers includes cutting materials such as cordura, velcros, kevlar, aramid, and various types of laminates. The main challenge for effective fume filtration here is the combination of both synthetic and mineral materials.

A new group of materials currently appearing in laser applications are laminates and composites. In the case of laminates, these are mainly combinations of plastics, and in the case of composites, materials based on various types of fibers (mainly glass fiber).

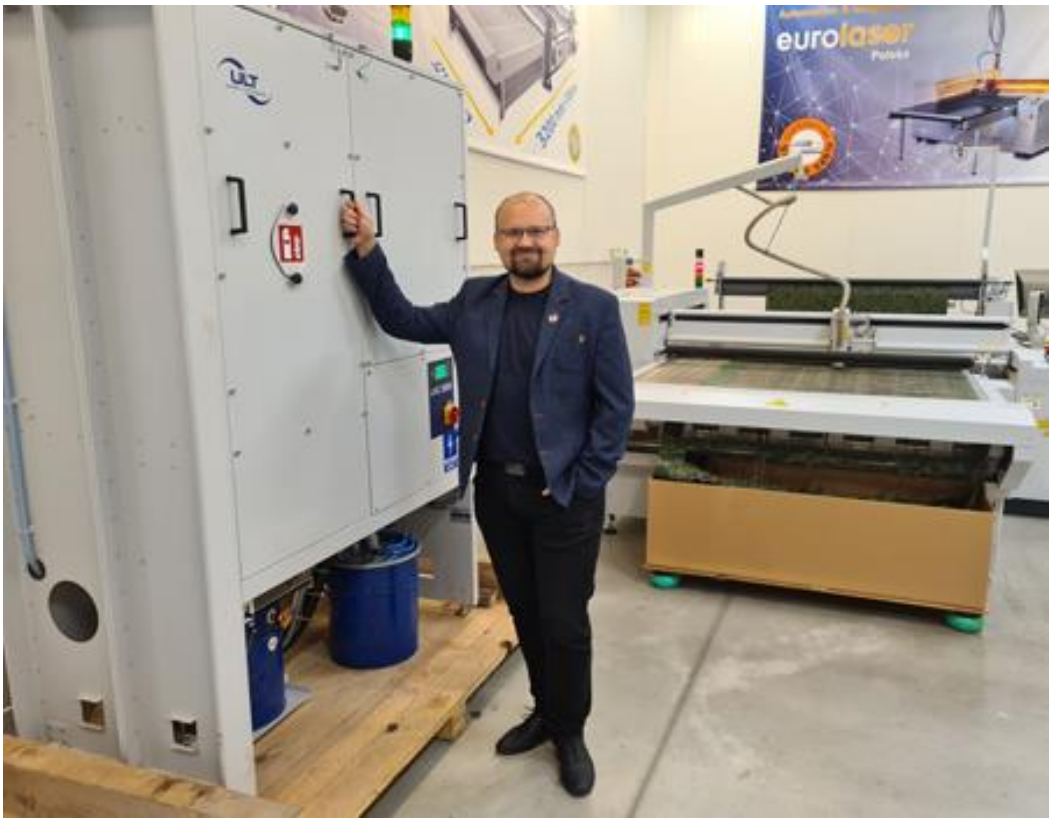

*Image 4: Mariusz Deptuch is happy with the LAS 800 laser fume extractor*

Mariusz Deptuch states: “The resulting laser fume from cutting these wide range of materials is very varied and contains, in addition to sticky particles, gases and aerosols. That is why we were looking for a solution that would ensure long-term protection of the filters and extend their lifetime. After more than 2,000 working hours, the laser fume extractor LAS 800 still suits very well these kinds of applications and fulfills all our requirements and needs.”

**The perfect solution for eurolaser**

Eurolaser has chosen the LAS 800 system as a compact and versatile cartridge filter unit dedicated to laser processing applications for small and mid-size laser systems, executing cutting, marking, welding, etc. The many upgrade and extension options within the laser fume extractor LAS 800 were another critical factor for utilizing the system.
For example, the eurolaser L-1200 conveyor system is used for laser cutting of a wide range of technical textile materials. The filter aid metering unit, included in the version of LAS 800 system helps to prevent filter clogging by sticky fume particles, resulting in a lot of cost-savings for filter exchange and replacement.

Mariusz Deptuch concludes: “Another great item is additional HEPA H14 filter with a downstream sorption filter of activated carbon. Thanks to this combination cleaned air stays in the production room. We don't need to make additional ventilation shafts and save energy costs for heating during the cold months. After 12 months of applying the LAS 800, we can recommend this unit for every, even very demanding users for their laser applications.”