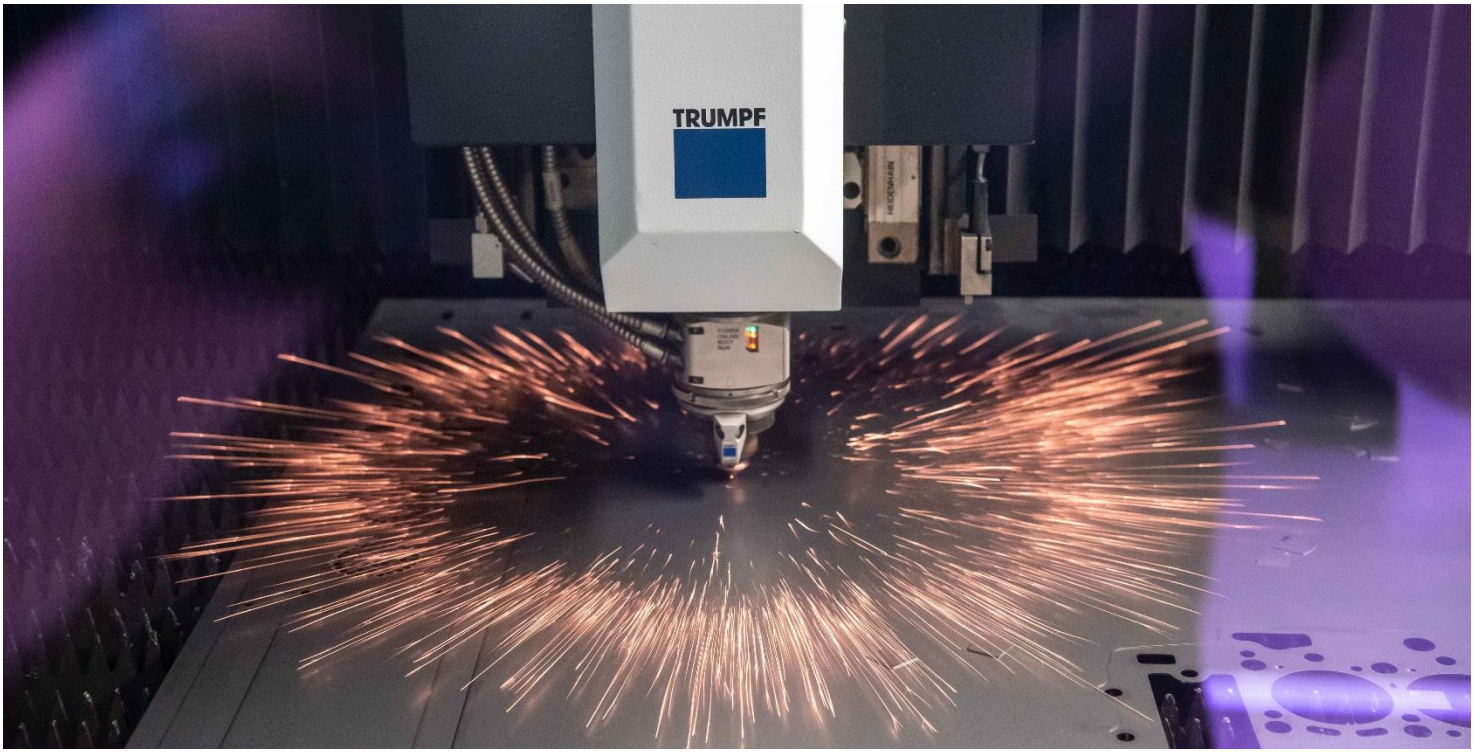
Safety Guide for 2D-Laser Cutting Machines

Protect your employees

The safety of employees is crucial in production. When using laser cutting machines, important safety instructions must be observed in order to protect employees and comply with legal regulations.

TRUMPF



The invisible dangers are the most dangerous

The safety of people has the highest priority in all process steps. As laser radiation is not perceived by human eyes, the following safety instructions must be observed when using laser cutting machines:

The laser device generates invisible laser radiation. Laser radiation is absorbed differently by biological tissue. It is usually converted into heat and causes burns and permanent damage to the retina, for example. Eyes and skin are especially at risk due to direct and reflective laser radiation.

Secondary radiation develops during laser processing due to the interaction between the laser beam and material. The secondary radiation is composed of invisible ultraviolet (<400 nm) and infrared radiation (>780 nm) and harsh visible radiation. Looking directly at the processing point can lead to blinding, corneal burns or damage to the retina. Intensive dazzling of the eye leads to a temporary impairment of your vision and can leave an image in your eyes. This can lead to confusion, impairments or accidents.

The requirements for laser safety are mandated by authorities.

Products that do not comply with safety regulations are taken off the market in Europe by the EU Safety Gate (formerly RAPEX) and in the USA by the FDA. The reason for this is often inadequate protection against laser radiation, but other safety gaps such as the risk of injury from sharp-edged parts, electrical voltage or missing circuit breakers can also be the cause. A CE marking is not a guarantee of compliance with these directives, but merely a declaration of conformity issued by the manufacturer.

Before purchasing laser cutting machines, you should therefore check whether they comply with EU safety regulations. Otherwise, there is a risk of

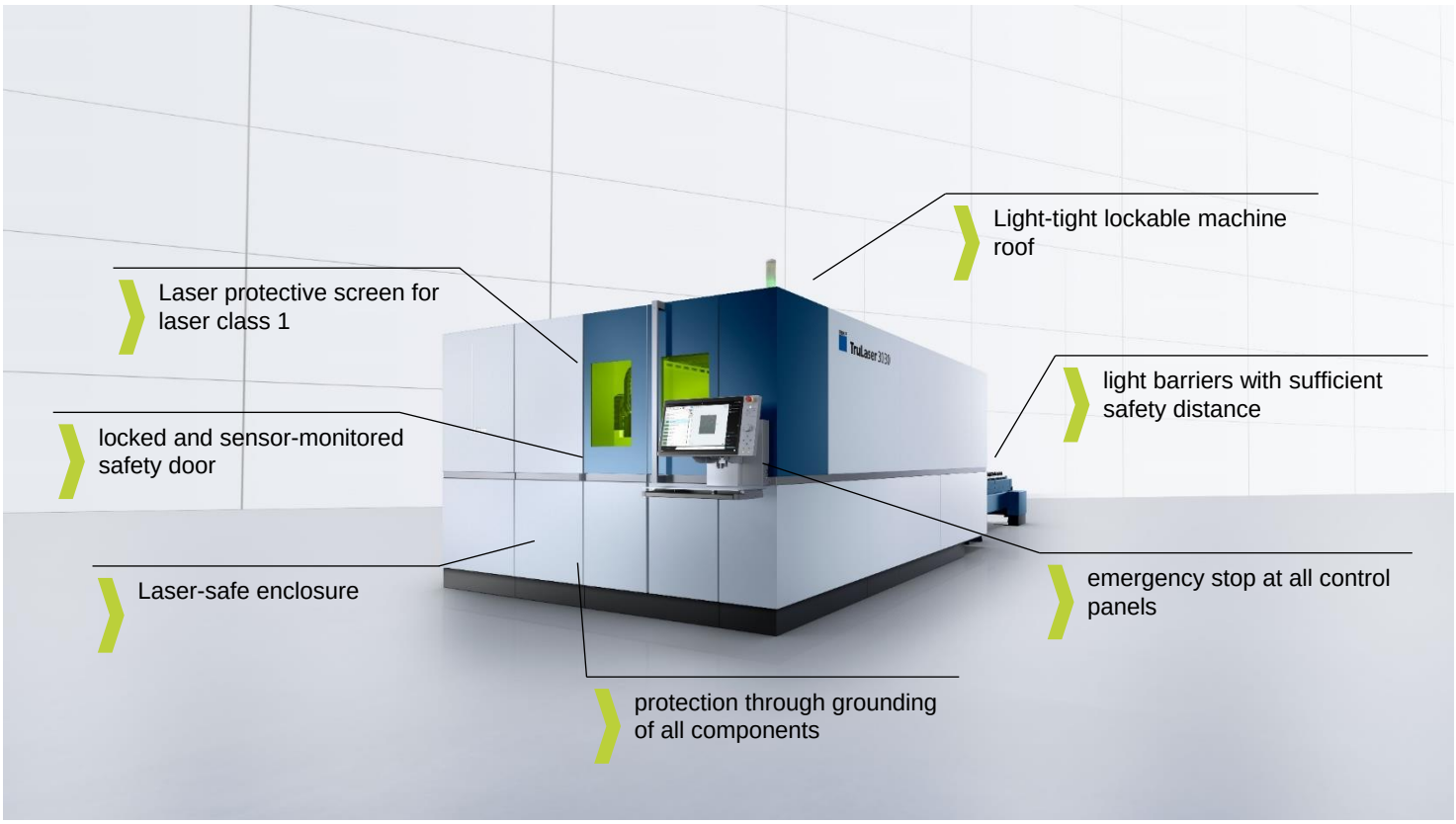
- jeopardizing employee safety.
- not being allowed to import the purchased machine. In extreme cases, machines that have already been installed can be shut down.
- potential production downtime and expensive retrofitting of existing machines.

Examples of machines that have been taken out of service for safety reasons can be found in the official online sources:

U.S. Food & Drug Administration
https://www.accessdata.fda.gov/cms_ia/importalert_255.html

EU Safety Gate (RAPEX)
https://ec.europa.eu/safety-gate-alerts/screen/search?resetSearch=true

Measures for reducing hazards at TRUMPF



TRUMPF complies with the requirements of the following standards to ensure safe operation:

- EN ISO 12100:2010 for risk assessment
- EN 60825-1:2014/A11:2021 for general laser safety
- EN ISO 11553-1:2020/A11:2020 for the safety of laser processing machines
- EN 60204-1:2018 for electrical safety
- EN ISO 13849-1:2015 for functional safety
- EN 50370-1:2005 and EN 55011:2016/A1:2017 for electromagnetic compatibility

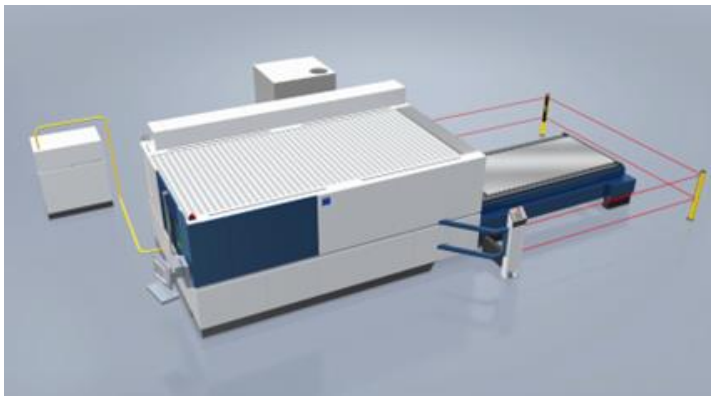
An overview of the safety requirements of the EU Cecimo according to the BAuA can be found at the following link:

EU Cecimo Laser Safety Guidelines
https://www.cecimo.eu/publications/guidelines-of-ce-marking-on-laser-machines/

The detailed report on TRUMPF's compliance with the Cecimo safety requirements can be accessed here:

TRUMPF‘s answers to the EU Cecimo Guideines
www.trumpf.info/d9f58r

TRUMPF‘s 2D-Laser Machine Safety at a glance

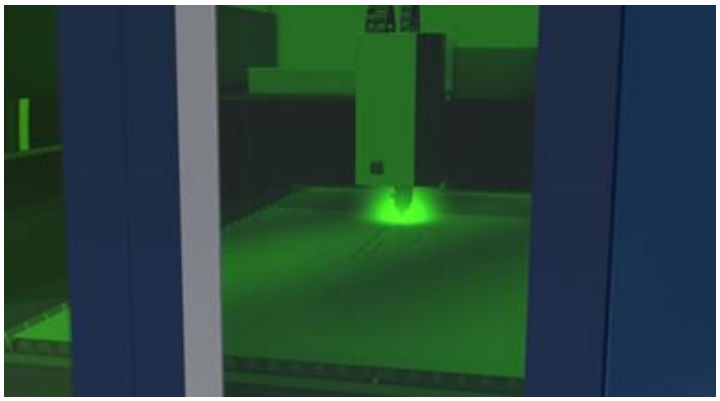


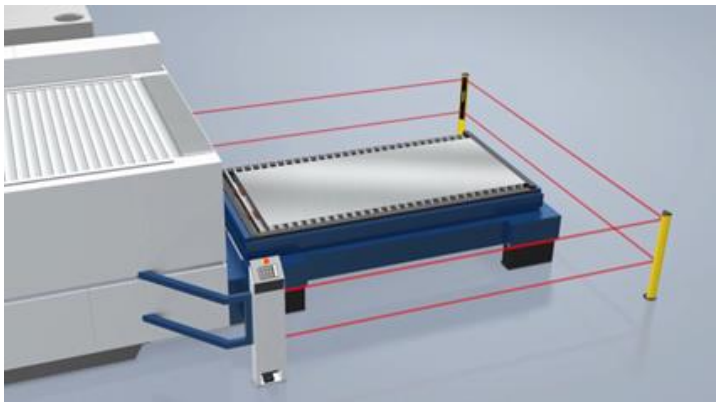
Laser-safe enclosure

TRUMPF 2D laser cutting machines comply with Laser Class 1. This means that no laser radiation escapes from the protective enclosure that could pose a risk to individuals. Openings in the housing, such as doors or the roof, are monitored and secured by safety switches. The laser can only be operated when all housing openings are closed.

Laser-absorbing protective glass

The machine's windows are made of laser-absorbing material. The wavelengths absorbed by the glass can be read from the specification on the laser protection glass. For example, the designation D AB6 872-1185 PF CE protects against wavelengths of 872 to 1185 nm laser radiation with protection level AB6. The thickness of the laser protection glass is also crucial. The higher the laser power, the thicker the glass should be.



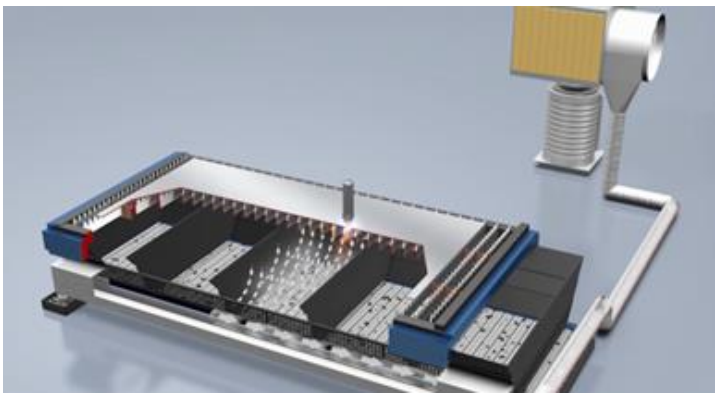


Feed hold and emergency stop in case of danger

The pallet changer is secured by a light barrier with a specified minimum distance. As soon as this area is entered during machine operation, a feed hold is triggered at the pallet changer and the axes are stopped. Additionally, in case of danger to personnel or the machine, the machine can be stopped manually by pressing the emergency stop button on the control panel or on the start post of the pallet changer.

Dust protection through extraction and dust collector

Laser cutting is a thermal process. Therefore, there is inherently a fire risk from metallic particles and dust. There is also a health risk if they are inhaled. The machine's extraction system prevents the accumulation of dust and the risk of fire in the machine room. The dust is extracted and directed to the compact dust collector, where it is filtered and collected.



TRUMPF Werkzeugmaschinen SE + Co. KG
Johann-Maus-Straße 2 · 71254 Ditzingen · Phone +49 (0) 7156 303-0 · Fax +49 (0) 7156 303-30309
E-Mail info@de.trumpf.com · Homepage www.trumpf.com
10/2024