DIODELA

Laser solutions for industry

LASER CLEANING SYSTEMS

Contactless | Highly precise | Safe for the operator and the environment

About Diodela

History:

Diodela is a developer of laser solutions for industry. Diodela was established as a spin-off company of the Center for Physical and Technological Sciences (FTMC). Using technologies exclusively developed and licensed for our company by FTMC, Diodela manufactures industrial laser systems for laser welding, cleaning, and other types of material processing. By closely collaborating with laser research centers and having extensive experience in photonics, we create innovative and precise laser systems that meet all the needs of industrial companies.

Diodela is based in Vilnius, one of the main laser technology parks, which unites the most important Lithuanian laser and engineering technology companies.

Products:

Diodela laser systems are designed and manufactured by professional scientists and engineers. We work closely with industrial companies to understand their changing needs and offer solutions to improve their technological processes. We guarantee high quality, competitive prices, fast production times and professional customer service. Diodela's mission is to develop innovative photonics solutions that drive sustainable industrial breakthroughs.

Our partners:

CENTER FOR PHYSICAL SCIENCES AND TECHNOLOGY

SCIENCE AND TECHNOLOGY PARK

LITEK

Our path: from idea to innovation

Diodela is a high-tech company from Lithuania that has been developing advanced laser welding solutions for industry since 2018. We specialise in **manual and robotic welding systems** that meet the highest efficiency and safety standards.

Key milestones in our development

- **2018 m.** – First international technology partnership established
- **2019 m.** – Development of the first handheld industrial welding laser prototype (DIO500)
- **Q1 2020** – First industrial cleaning laser **(S-100)** developed in Q1 2020
- **Q3 2020** – **Diodela** officially established in Q3 2020
- **Q4 2020** – Commercialisation of the 1 kW CW hand-held laser welder launched in Q4 2020
- **Q1 2021** – Launch of **international distributor network**
- **Q2 2021** – introduction of higher power 1.5 kW and 2 kW CW welding lasers
- **Q1 2022** – first **robotic integration with robot head** implemented
- **Q3 2022** – **100th laser produced in Q3 2022**
- **2023** – **20 lasers per month** on average assembled in production
- **Q1 2024** – First **robotic welding cell** developed in Q1 2024
- **Q3 2024** – **New design** fully compliant with **IEC 60825-1 safety standard** introduced
- **Q2 2025** – Next generation **robotic welding solution** launched

Our values and objectives

- **Innovation** – we continuously improve our products in close collaboration with engineers, operators and manufacturing companies.
- **Quality** – we use only high-quality European components in our production, ensuring reliability and durability.
- **Partnerships** – we seek long-term relationships with distributors, integrators and manufacturers across Europe.
- **Sustainability** – we develop solutions that help reduce energy consumption and environmental impact.

Looking to the future

Diodela aims to become one of the leading developers of laser welding technology in Europe - offering solutions that are not only efficient, but also safe, intuitive and adaptable to the needs of different industries.

About laser cleaning

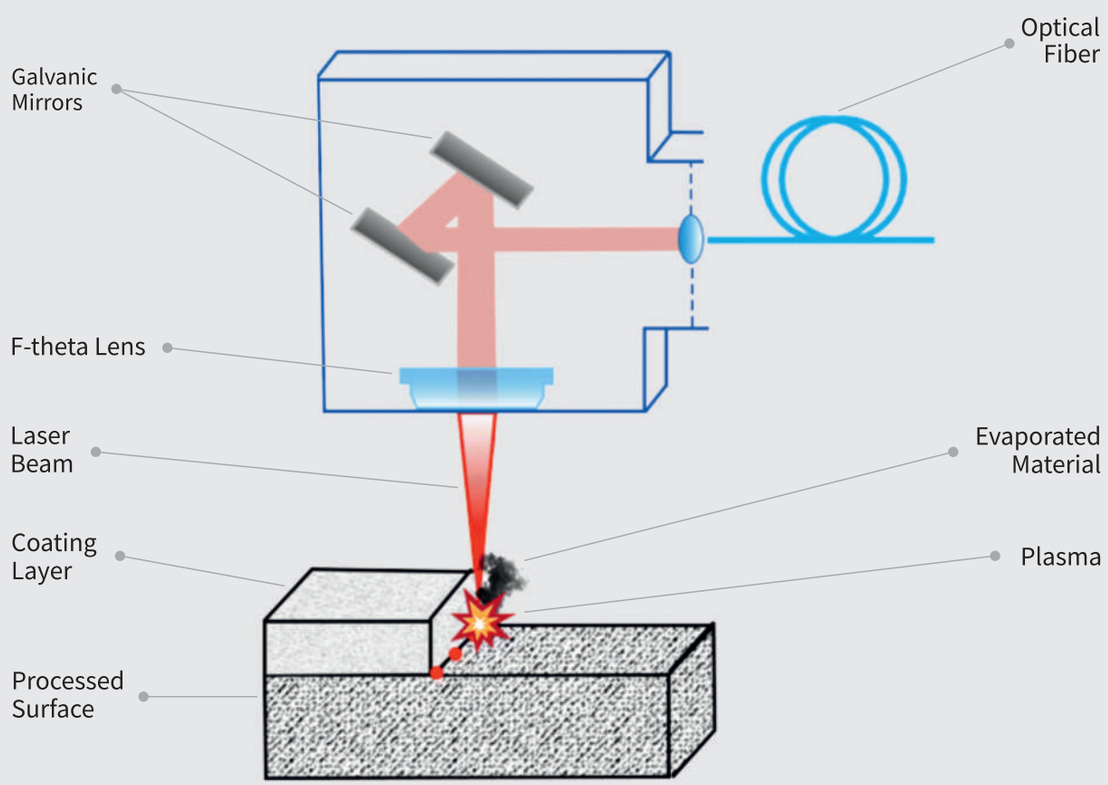
Operating Principle

Laser cleaning is an advanced surface treatment technology that uses concentrated laser radiation to remove unwanted contaminants, oxidation products, paint residues, or other organic and inorganic layers from surfaces. The cleaning process does not use chemical reagents or abrasive materials, making it non-invasive and environmentally friendly.

Laser energy acts locally, being absorbed by the contaminants or coating layer but not by the base material, thus avoiding thermal or mechanical damage to the treated surface. This makes the technology ideal for cleaning sensitive or structurally complex surfaces. The technology allows precise control of the removal depth and area, ensuring maximum selectivity and processing efficiency.

Compared to traditional methods such as abrasive cleaning or chemical treatment, laser cleaning offers higher efficiency, lower operational costs, and minimal environmental pollution.

During laser cleaning, a high-energy laser beam causes the instant heating, vaporization (sublimation), or micro-evaporation of surface contaminants, removing the coating while the base remains practically unchanged. This creates excellent conditions for subsequent surface preparation operations such as gluing, painting, welding, etc.



Pulsed or continuous wave (CW)?

Continuous Wave Laser Cleaning (CW)

Continuous wave lasers generate a constant, uninterrupted beam with high average power (usually 1000–3000 W). Such systems are suitable for processing large areas and less sensitive surfaces, such as removing rust from metal structures or car bodies.

Advantages:

- High throughput – ideal for fast cleaning of large areas.
- Stable operation – suitable for long-duration work without interruptions.
- Simpler system architecture, lower equipment cost.

Disadvantages:

- Higher thermal load on the surface – not suitable for sensitive, thin-walled, or heat-sensitive materials.
- Often requires additional surface preparation after cleaning (e.g., grinding or activation).

Suitable for:

- Contaminants adhered to the surface, such as paint residues, oil, grease, oxides.
- Large, flat, less sensitive surfaces.

Continuous Wave (CW) Cleaning

Pulsed or continuous wave (CW)?

Pulsed Laser Cleaning

Pulsed lasers generate short (nanosecond or picosecond duration) high-power light pulses, whose energy is selectively absorbed only by the surface coating or contaminant. These pulses cause a sudden impact only on the target material, leaving the main surface almost unaffected by thermal effects.

Advantages:

- High peak power – allows effective removal of even complex, strongly adhered, or chemically stable coatings.
- Minimal thermal impact – ideal for thin-walled, precise, or heat-sensitive parts.
- Excellent selectivity – ensures cleaning accuracy even on uneven or textured surfaces.

Disadvantages:

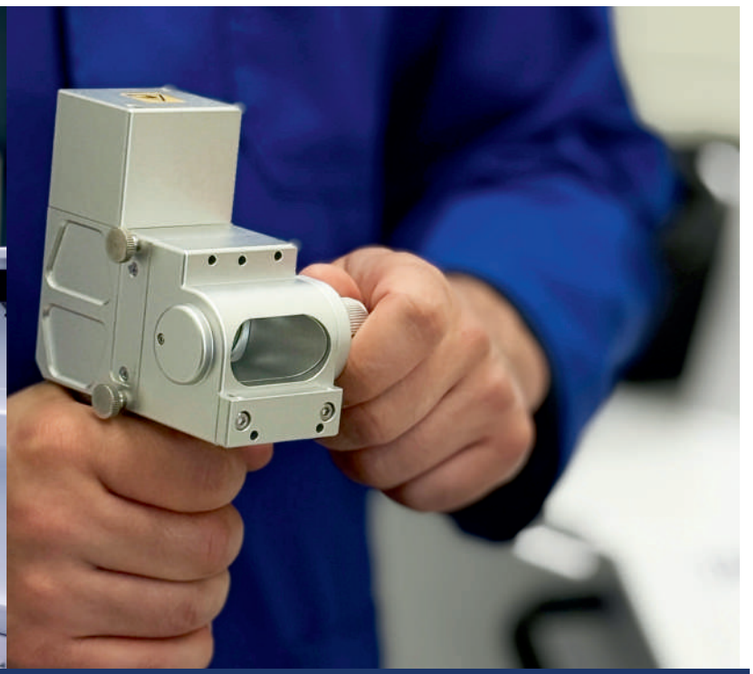
- Higher equipment costs.
- Slower cleaning speed for large areas due to the intermittent beam.

Suitable for:

- Removal of oxide layers, paints, resins, welding slag, corrosion products.
- Components requiring high cleanliness or geometric precision.

Pulsed Laser Cleaning

Pulsed system torch



Continuous wave system torch

Diodela laser cleaning systems

Diodela laser cleaning systems are manufactured using continuous wave and fiber laser technologies developed in collaboration with the Lithuanian Engineering College (LIK) and the Center for Physical and Technological Sciences (FTMC) staff in Lithuania. This ensures that each of our laser devices is of the highest quality.

The operating time of laser cleaning systems: **more than 90,000 hours (10 years).**

All Diodela laser systems come with a 24-month warranty and mandatory safety and operator training.

How to Choose a System?

The simplest way is to send us samples (preferably several 10 x 10 cm components relevant for cleaning). During testing, we will measure the exact cleaning speed and impact on the material or component. After the tests, we will offer the most effective system for your application.

All systems come with the necessary equipment for work: Standard (8 m) optical cable, power cable (2 m long - can be modified), accessory kit (2 pairs of safety glasses, 2 respirators, detector, lens set, etc.)

Important Notes:

- Power is not the only parameter determining the system's efficiency or application. Contact the Diodela team to discuss which type of laser cleaning will be most effective for you.
- All laser systems have a 2-year warranty, with the possibility to extend the warranty to 3 years.
- All laser systems are Class 4 lasers, so safety training is mandatory.
- The laser welding process can be used both manually and in large-scale automated workshops, achieving a cleaning speed of 1-10 sq.m/h.

Laser Safety

1. Laser operator training with EU accreditation
2. Distance sensor
3. Full integration with any welding booth
4. Dual-channel door sensor
5. Door reset button
6. Dual-channel emergency stop
7. Safety glasses


#1


#2

#3


#4


#5

#6

SPECIFICATIONS

Model	FCS-50	FCS-100	FCS-200	FCS-300	FCS-500	FCS-1000	FCS-1500
Output power	50 W	100 W	200 W	300 W	500 W	1000 W	1500 W
Stability	< 3 %	< 3 %	< 3 %	< 3 %	< 5 %	< 5 %	< 5 %
Maximum Pulse Energy	1 mJ	4 mJ	8 mJ	12 mJ	15 mJ	30 mJ	-
Repetition rate range	50-250 kHz	25-250 kHz	25-250 kHz	25-250 kHz	20-250 kHz	20-250 kHz	Modulated up to 50 kHz
Pulse duration	10 - 500 ns	10 - 500 ns	10 - 500 ns	10 - 500 ns	10 - 500 ns	100 ns	Constant
Spectrum width	< 5 nm	< 5 nm	< 5 nm	< 5 nm	< 5 nm	< 5 nm	< 5 nm
Maximum current	6A	8A	8A	8A	16A	16A	24A
Operating voltage	230 VAC	230 VAC	230 VAC	230 VAC	280 VAC	280 VAC	230 VAC
Operating room temperature	0-40°C	0-40°C	0-40°C	0-40°C	0-40°C	0-40°C	0-40°C
Cooling	Air	Air	Air	Air	Integrated, filled with distilled water	Integrated, filled with distilled water	Integrated, filled with distilled water
System preparation for operation	< 1 min	< 1 min	< 1 min	< 1 min	< 1 min	< 1 min	< 1 min
Operating room humidity	10-90% (at 40°C)	10-90% (at 40°C)	10-90% (at 40°C)	10-90% (at 40°C)	10-90% (at 40°C)	10-90% (at 40°C)	< 70 % (at 40°C)
System dimensions	485 x 390 x 180 mm	590 x 550 x 525 mm	590 x 550 x 525 mm	590 x 550 x 525 mm	930 x 835 x 525 mm	930 x 835 x 525 mm	1200 x 600 x 1300 mm

Additionally Provided:

- Diode laser sources
- Fume extraction equipment
- Robotic solutions
- Extended warranty
- Protective laser cabins, curtains, and windows
- Laser safety training

CE

Application Areas

Metal

- Rust removal from all metals.
- Paint and coating removal from various metal surfaces.
- Oxide and deposit removal from metal parts.
- Cleaning of weld seams and preparation of metal surfaces.

Wood

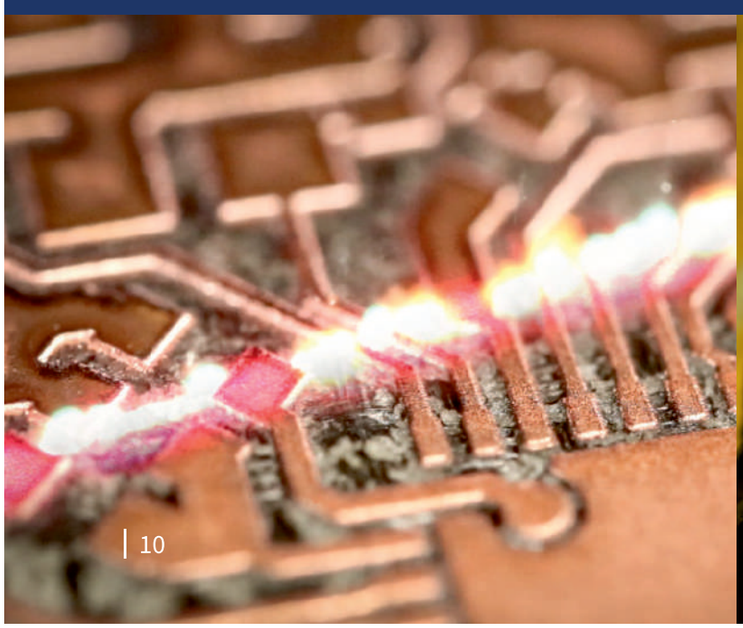
- Paint or varnish removal from wooden surfaces.
- Restoration of wooden artifacts or furniture.

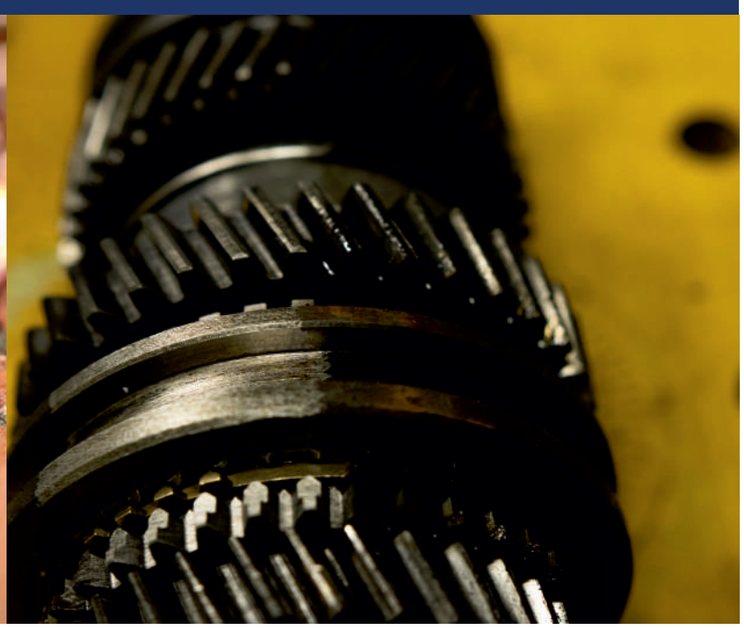
Electronics and Printed Circuit Boards

- Removal of appropriate coatings for repair and maintenance.
- Cleaning of electronic components, such as solder joints.

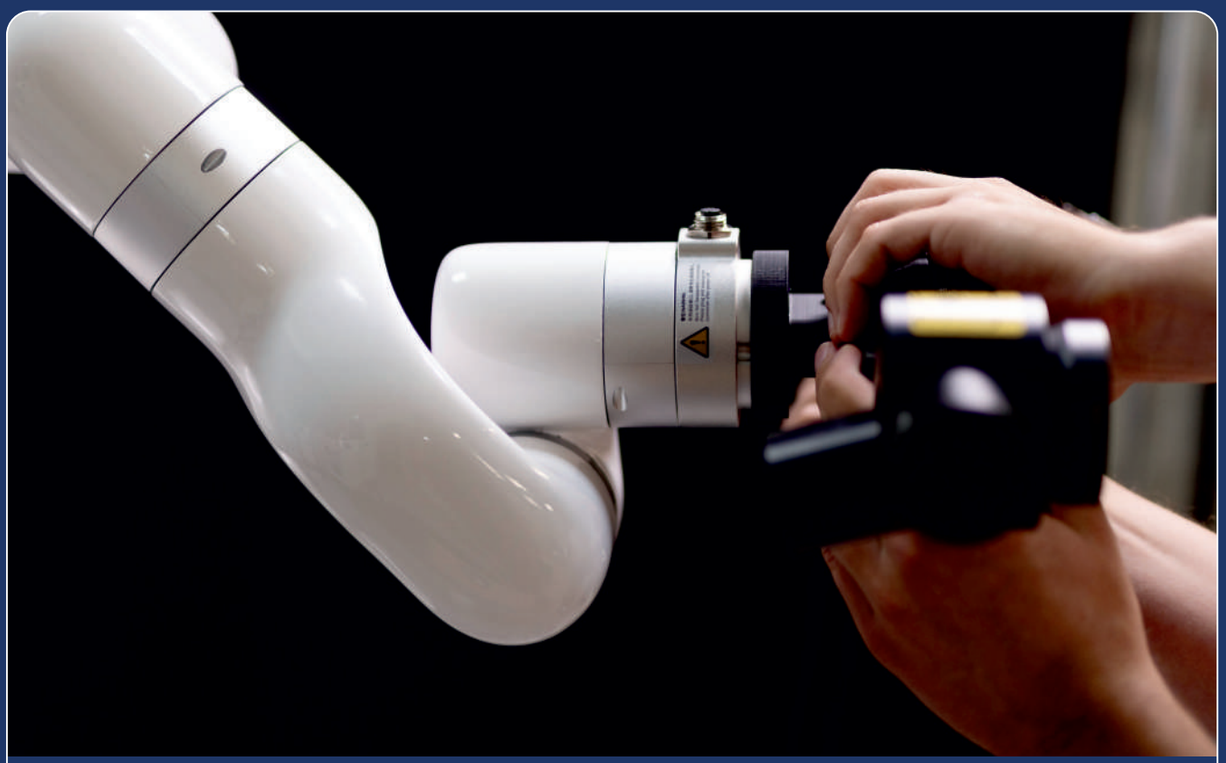
Automotive Industry

- Paint and coating removal from bodywork and components.
- Rust removal from vehicle frames and components.





Robotic Laser Cleaning Solution



Simple and quick installation on any cobot or robot.

Robot-controlled cleaning process.

Robotic cleaning solution at "Lithuanian Railways".

Diodela Laser Cleaning Results

Advanced Active and Passive Safety Measures

Every Diodela system is equipped with the **highest level of safety features**, allowing operators to work safely, confidently and uninterrupted.

Key Features:

- **Dual-channel Emergency Stop button -** allows the system to stop immediately, even in the event of a technical failure.
- **Two-channel door sensor -** the laser is only activated when the hood is closed, eliminating the risk of human error.
- **Distance sensor -** ensures that the laser only operates at the correct tip position.
- **RESET button -** allows the system to be safely restarted after activation of the security system.
- **Safety glasses and shields.** Protects eyes from Diodela laser radiation.
- **Integration with guard booths and robotic cells -** allows the system to be easily adapted to different production environments.

Professional Operator Training – An Investment in Safe Work

Diodela offers **EU accredited training** for equipment operators. They not only help to meet legal requirements, but also **ensure real safety.**

Training Topics:

- Rules for the operation of laser equipment
- Laser classification and risk management
- Use of personal protective equipment
- Practical examples of hazard prevention
- Safe system start-up, operation and shutdown

TRAINED OPERATOR = SAFE WORKPLACE + EFFICIENT RESULT

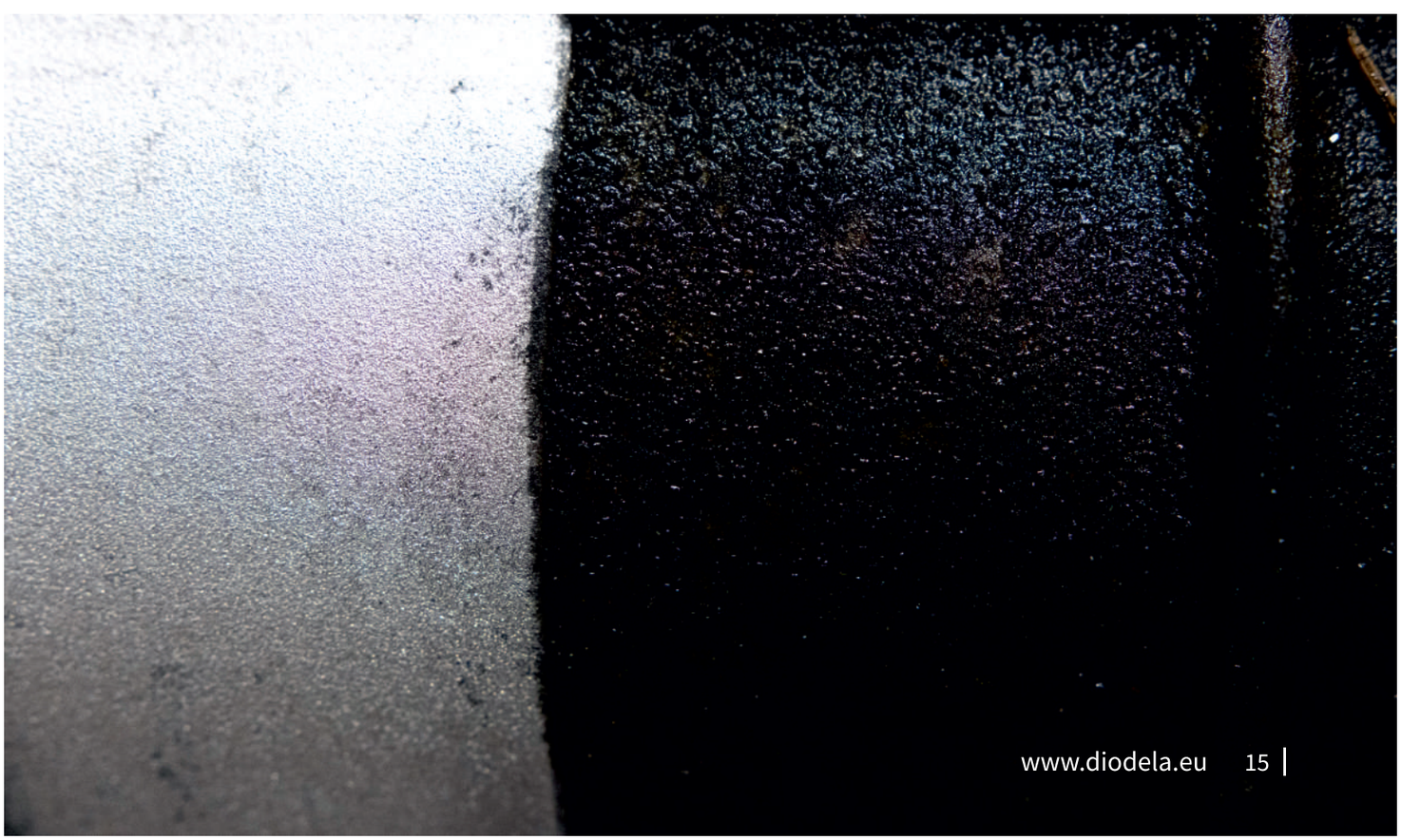
Why is safety so important?

- **Lasers operate with an invisible**, **high-power beam** that can be dangerous even without direct contact.
- **Safety ensures continuity of work** - no downtime due to accidents.
- **Workers feel safe** when they know the equipment is protecting them every step of the way.

The safety aspect	Description
Compliance with standards	EN 60825-1, EN 12254, EN 207 certificates
Active safety features	Proximity sensor, door sensors, emergency stop, RESET, earthing
Integration	Full compatibility with robotic stations and cabs
Training	EU accredited operator training
Benefits	Protection against injuries, accidents, radiation exposure

Efficiency starts with safety

Diodela doesn't just build lasers - we build safe workplaces.



DIODELA

Laser solutions for industry

Contact us:

sales@diodela.eu

Diodela, UAB

www.diodela.eu

Distributor

Follow us:

@Diodela

@Diodela Photonics

@Diodela.Photonics