



**\*P=Laser.**

**\*EMPOWERING PEOPLE,**  
THROUGH LASER TECHNOLOGY.

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## \*EMPOWERING PEOPLE, THROUGH LASER TECHNOLOGY.

Our brand essence – Empowering People Through Laser Technology refers to our approach to develop laser technology with a unique focus on the human connection. This is how we at P-Laser build lasting bonds with our customers, partners, and employees, putting their needs, challenges, and experiences at the heart of our work. Our laser cleaning technology is therefore not only accurate and effective, but also user-friendly, safe, and sustainable.

By putting the human connection first, P-Laser can develop laser cleaning solutions that help industries become more efficient, productive, and sustainable.

### AMBITIOUS

P-Laser has a constant drive to push the boundaries of laser technology, aiming to provide the best and most advanced laser cleaning solutions to customers around the world. On top of supplying high-quality products, our ambition also translates into the continuous search for improvement and progress, in the broadest possible sense.

### CUSTOMER-ORIENTED

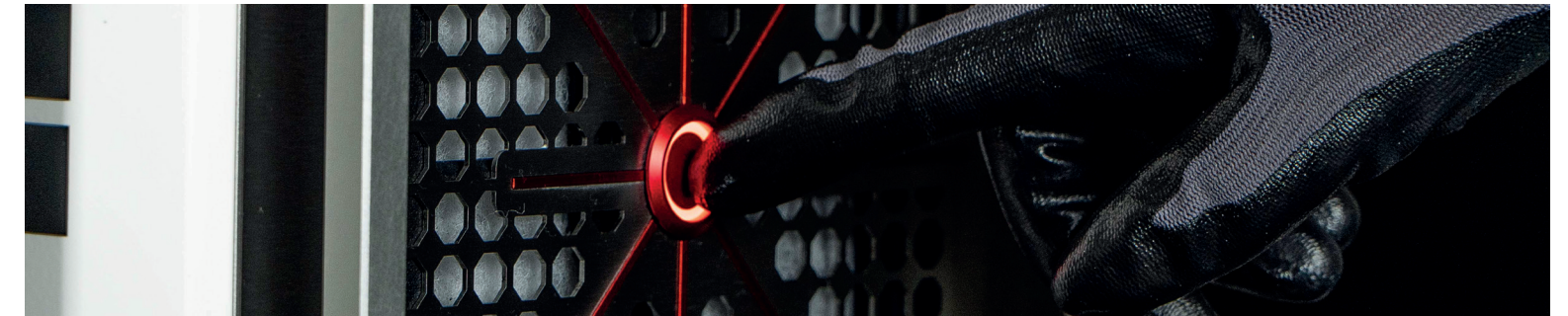
P-Laser focuses on the customer and constantly strives to provide them with the best possible solutions.

We place great importance on understanding each customer's unique challenges and work closely with them to provide solutions tailored to their specific requirements.

### SUSTAINABLE

P-Laser offers a sustainable alternative to traditional cleaning methods that can be harmful to the environment.

Indeed, the use of advanced technologies and materials ensures that our products are energy-efficient and environmentally friendly. For P-Laser, sustainability is also about our relationships with customers and partners. We aim for long-term partnerships based on mutual trust and respect.





# WHY LASER CLEANING?

Laser cleaning is a powerful and innovative technique used for the removal of contaminants and surface coatings from various materials. This method employs high-intensity laser beams to vaporize and remove unwanted substances without damaging the underlying surface.

Compared to traditional methods of cleaning such as chemical cleaning or abrasive blasting, laser cleaning offers several advantages that make it a preferred choice in various industries.

 **P-Laser**

INDUSTRIAL LASER CLEANING

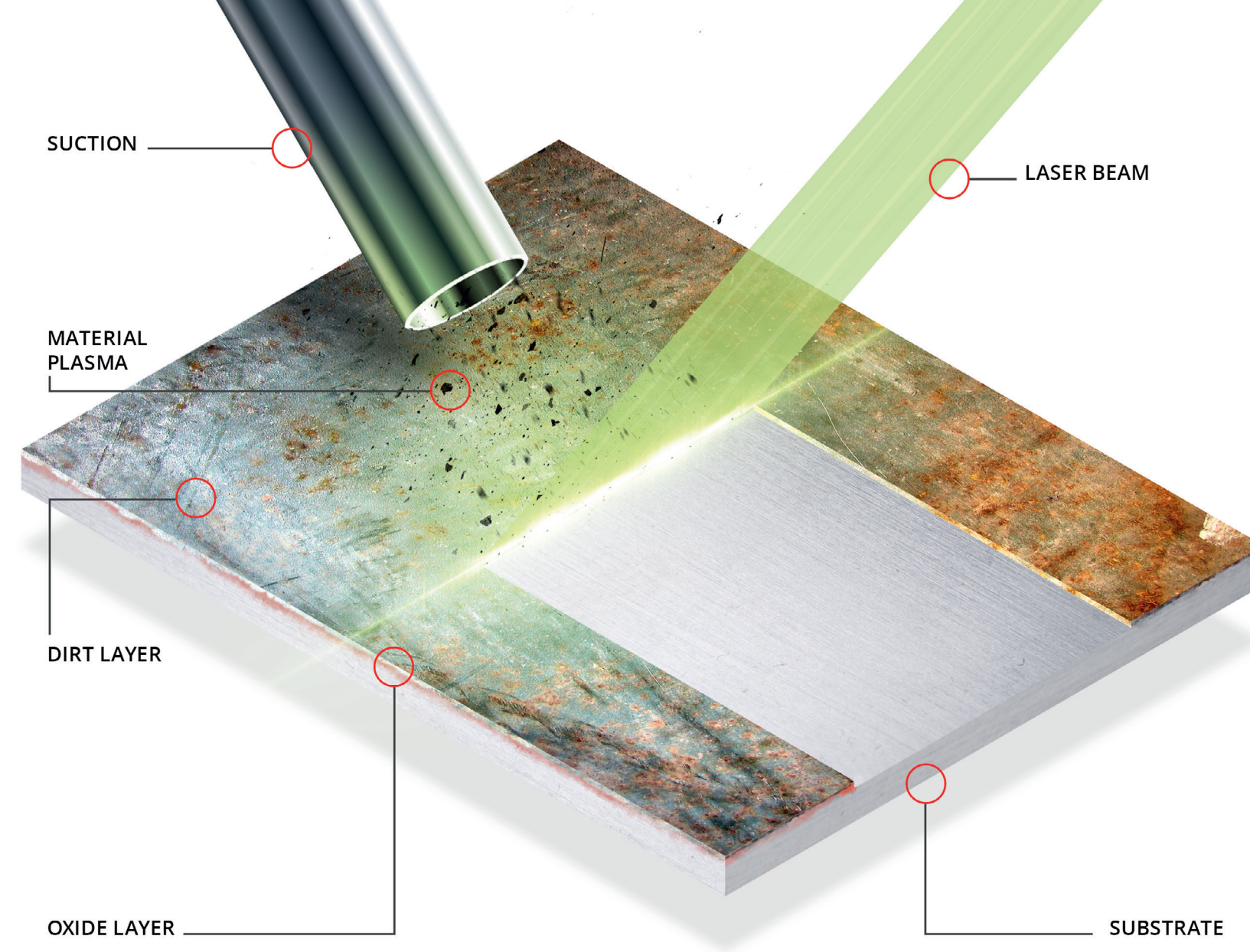


# HOW LASER CLEANING WORKS



## THE TECHNIQUE

Industrial laser cleaning - or ablation - is the process of clearing away undesired material from a solid surface by irradiating it with a laser beam. By absorbing the energy of the laser beam, the targeted material is heated very quickly, making it evaporate or sublimate. As the surface below does not absorb any energy, it stays untouched.



By manipulating the laser flux, its wavelength and its pulse length, the amount of material that is being removed by a single laser pulse can be controlled with extreme precision. Making laser cleaning equally suitable for rapid and deep rust removal as for removing only one thin layer of paint, without damaging the base coat.

ADVANTAGES

As laser cleaning does not use any chemical solvents or other kind of consumables, it is environmentally friendly and safe to operate.

Other advantages:

- 1. Non-abrasive
- 2. Eco-friendly
- 3. Precision
- 4. Cost-effective
- 5. Versatile in use
- 6. Absolute minimum of residue
- 7. Easy to automate
- 8. Minimal maintenance
- 9. Quick installation and setup time

PLANET

Laser cleaning offers a cleaning solution that does not require added media, such as chemicals, water/ice or sand. As a result, the waste production of laser cleaning is substantially lower than that of traditional cleaning methods. The transformed waste by the laser is minimized to the lowest level. In addition to this, the underlying surface is not affected, in contrast with abrasive sand blasting. Because of this, the cleaned part has a significantly longer life span. The longer the parts can be used, the more durable production and reparation processes become.

PEOPLE

While removing rust, paint, or any other contamination, the operator risks are numerous. It's our mission to strive for the best possible working conditions. Staying away from chemicals and contaminated media is a start, but we know we can do better. That's why we're constantly adapting our machines to meet the needs of operators.

PRODUCT EFFICIENCY

The laser cleaning process guarantees a stable cleaning, which is highly reproducible, especially when it is fully automated. We are trying to be the most efficient and durable cleaning method when compared to alternatives such as ice and sandblasting. One of the main benefits of laser cleaning is that it has little effect on the base material, which means the lifespan of tools, moulds and welds increases, and the cost of replacing those parts is reduced.



# SERVICES





## RENTING LASER CLEANING EQUIPMENT

### Try before you buy

If you have a typical laser cleaning job, but you don't want to invest immediately in a complete laser cleaning system, why not rent it?

Same thing if you would like to test if our laser equipment can answer your specific cleaning issues. Depending on your wants and needs, we rent you the ideal laser cleaning equipment, just for the time you need it.

P-Laser has the biggest renting fleet in the world, from 50-1000W, in portable or trolley versions.





# TEST CENTER



## P-LASER'S R&D TEST CENTER

### We deliver your needs

P-Laser offers assistance to companies who want to implement our lasers in their processes or production lines. We take a look at all the information and factors which are needed to build a successful process around the laser.

If necessary we work together with experienced partners to make sure the transition is as smooth as possible.



## FEASIBILITY STUDY

In the P-Laser test center, our researchers run laser cleaning tests on demand of our customers, or to examine for ourselves if laser technology is suited for new materials or applications we encounter.

We have a complete testing lab:

- Adhesion pull tests
- Dust tests
- Roughness measurements
- Layer thickness measurements
- Infrared monitoring
- 3D microscope
- Robot ABB IRB 1600
- Denso
- CNC machine
- Spectral analysis
- EDX analysis
- Scanning electron microscopy

So if you doubt whether laser technology can answer your cleaning concerns, do not hesitate to contact us. We will be happy to put your case to the test.



## DEMOS

Are you interested in taking your way of industrial cleaning to a higher level?  
Then request your first demonstration. This can be done through us or through our local representatives.

This is our standard procedure for demonstration visits:



An introduction between P-Laser and your company. If laser cleaning is new to you, we will elaborate our technology.



You will get a demonstration of the machines. If you bring test pieces with you, we can try it. We will let you use the machines as well, so you immediately get the feeling about using our lasers.

**PLEASE NOTE:** for many applications we have to find the right parameters to achieve the desired result. This can take a lot of time, so we don't do this during visits. Usually the test pieces will be left with us and you will receive a report about it later on.



You can share your thoughts and we can make arrangements for further steps.



### Here are some things to take into account:

- Long (work)wear. It doesn't necessarily need to be workwear, but most important is that it should be comfortable to work with and covers the skin.
- Working shoes are not obligated, but we recommend it. We don't have extra for visitors.
- We have gloves, but you are free to bring your own if you prefer.



# PRODUCTS

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P-Laser offers you industrial laser cleaning systems, ranging from 50 to 2000 watt. This equipment enables you to effortlessly remove rust, dust, oxides, oil and other contaminations from metal, plastic, ceramics, glass, stone or concrete.

As this cleaning technique leaves the surface beneath untouched, our laser systems offer unexpected possibilities for a constantly growing number of industrial applications, ranging from marking or labeling to surface preparation for non-destructive testing.

Over the years we have built and developed a varied portfolio that covers various applications. We have machines from 50 to 2000 watt. We have two lines: machines for manual use, and machines that can be integrated into automated setups.





## MOBILE UNITS

**P-Laser Low Power Compact systems**, with the laser power of 50 or 100 watt, produce a high-density beam. It allows precise and fast removal of various contaminants like rust or thin layers of paint:

Similar to our low power systems, the **QFC-200** and **QFC-300** have a compact design. These portable machines with integrated wheels and extendable handles are easy to transport and manoeuvre. A mobile optic allows us to reach and clean the most difficult spots.

Our **QFC-200** and **QFC-300** have proven to provide precise and fast results in coating removal, deoxidizing, derusting, mould cleaning, weld preparation and more.

Starting with a weight of only 14 kg, QF Compact systems can be easily moved round and even the most unreachable spots can be cleaned.



As with every P-Laser system, 8 custom jobs can be created and selected with our dedicated software CleanSweep. You can easily switch between the jobs when operating the laser in different applications across different surface types.

All our systems are designed and produced at our HQ in Belgium. We use high quality laser source that ensures a long lifetime, with up to 50 000 hours of emission.



**P-Laser 500 - 2000 watt systems** are truly state-of-the-art machines that combine high pulse power with large surface coverage for even faster cleaning jobs. They produce a low-density beam that is used in situations where avoiding damage to the substrate is paramount. Mould cleaning, rust removal, paint removal, and surface preparation are the most popular applications for these types of machines.

Mobile optic allows us to reach and clean the most difficult spots. An external vacuum system can be added to the mobile optic, to ensure good extraction of harmful dust or fumes. Besides the mobile version, the machine optic is available and can be integrated in any production or assembly line.

As with every P-Laser system, multiple custom jobs can be created and selected with our dedicated software CleanSweep when operating the laser in different applications across different surface types.

All our systems are designed and produced at our HQ in Belgium. We use high quality laser source that ensures a long lifetime, with up to 50 000 hours of emission. P-Laser high power laser systems have been successfully adopted in aeronautics, military, shipyard, and other industries.





## INTEGRATED SOLUTIONS

Today, the rapid evolving industries demand for automated solutions is high and marked by rapidly advancing technologies, complex systems, and intricate processes. It demands joined forces of specialists who can navigate and control these complexities with the goal to deliver efficient solutions that meet the industry's demanding requirements.

Some of the key drivers for process automation:

1. Production cost & capacity
2. Labour cost - availability – reliability
3. Competitive position
4. Product quality
5. Safety & environment
6. Operator ergonomics
7. Process goals  
(speed - temperature – surface - ...)



Laser cleaning is ideal to integrate into your production process. That is why we have created a line that can be automated. The extraction of the evaporated layer and any dust particles is also integrated in the laser head. The cleaning is done 24/7 and with a consistent quality of cleanliness. When fully automated, laser cleaning systems maximize the technologies' advantages and economic amortization potential.

We take care of the development of the specific laser processes, as well as the configuration of suitable laser source, parameters and optics. In combination with our powerful software, unique customer-specific solutions can be realized.



# APPLICATIONS

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The number of laser cleaning applications is growing exponentially. Every day new possibilities are discovered and explored. From the classical rust removal to the restoration of natural stone building facades. And everything in between: paint removal, de-coating, mould cleaning, de-oiling, special surface treatment and even labeling and marking. The industrial applications of P-Laser products vary from the most inaccessible tiny areas to vast surfaces of public or private infrastructure. Always delivering results above expectations.



# MOULD CLEANING

## LASER CLEANING IS THE BEST OPTION

When cleaning moulds it is extremely important that the surface structure and form factor is not affected by the cleaning technique. Unlike sandblasting and dry ice blasting, no force is exerted with the laser. With abrasive methods, it is the impact on the contamination that provides the cleaning, but which has the same effect on the mould itself, causing wear and tear that shortens the life of the mould.

With laser cleaning, the pulsed laser beam passes through the contamination and is reflected on the mould. This reverberation does not cause heating or roughness on the mould. The contamination evaporates and can easily be extracted up with a vacuum cleaner.

## CASE RUBBER MOULD CLEANING

Moulds for tyres are extremely expensive and require regular maintenance. Some tyre manufacturies spend more than 1000 kg on dry ice per day. That's more than €250,000 a year and they run the risk of running out of dry ice during the summer months. In addition to dry ice, chemicals are used. Here the bill can go up to € 80,000 per month.

### Advantages:

- The moulds are not affected and no longer need to be replaced in contrast to grit blasting which does damage the moulds
- The costs of polishing are eliminated completely, such as the purchase of grit, energy costs of the blasting machines, transport, waste processing and labor
- No waste is created that needs to be disposed of
- Deep cleaning and better cleaning of air vents

	Speed of cleaning (m²/h)			
	50 W	100 W	300 W	500 W
Tyre moulds	1.70 - 2.90	3.50 - 5.80	7 - 10.3	25.9 - 35.3



For cleaning tyre moulds, we recommend a QF-500 in an automated setup.



# COATING REMOVAL

There are many different types of coatings, ranging from non-stick coatings to marine coatings. What they have in common is that removing old coatings can be very difficult. After all, they're made to last for decades. Depending on the type of coating, aggressive cleaning techniques such as sandblasting and pyrolysis are often used to remove the coating layer. It takes a very long time to get everything off, which causes a lot of wear and tear on the parts to be cleaned.

Laser cleaning has two major advantages here. The removed material is immediately collected in an extraction system. And there is no wear to the underlying surface. The laser beams make a very selective distinction between paint and the underlying material due to the difference in ablation temperature. You can even selectively remove layers of your choice.

Laser paint removal is used in areas such as aircraft and ship maintenance, infrastructure maintenance such as bridges that are still coated with paint containing lead and the maritime industry.

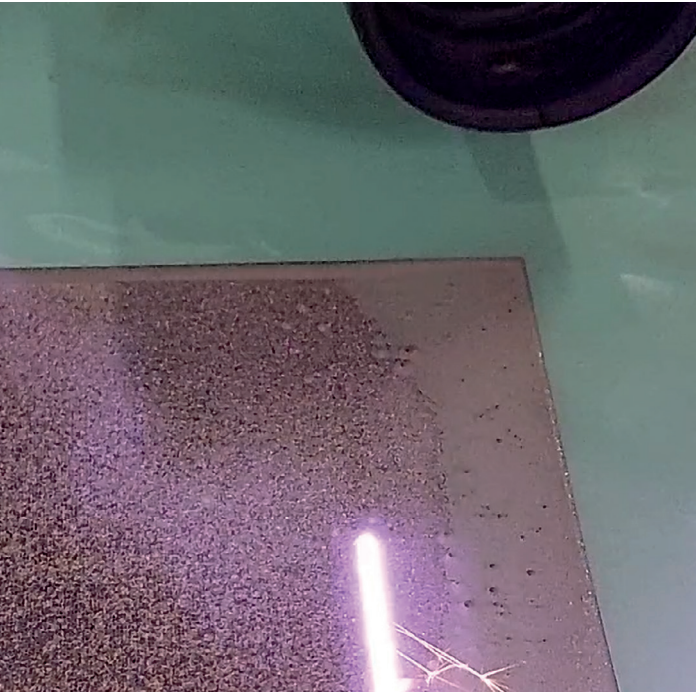
Overview of coatings for which laser cleaning is suitable:

- Anti-slip coating
- UV coating
- Waterproof coating
- Release agent
- PTFE-coating
- EPDM coating
- Antistatic coating
- Color coatings and primers
- Epoxy coating
- E-ecoating
- PVD coating

CASE EPOXY CLEANING IN A SHIP

In this case we removed epoxy coating in a marine environment on a steel blasted base material. What are the average cleaning speeds:

	Speed of cleaning (m²/h)		
	500 W	1000 W	2000 W
Epoxy paint (600 µm)	0.27	0.57	1.05



For cleaning tyre moulds, we recommend a QF-500 in an automated setup.

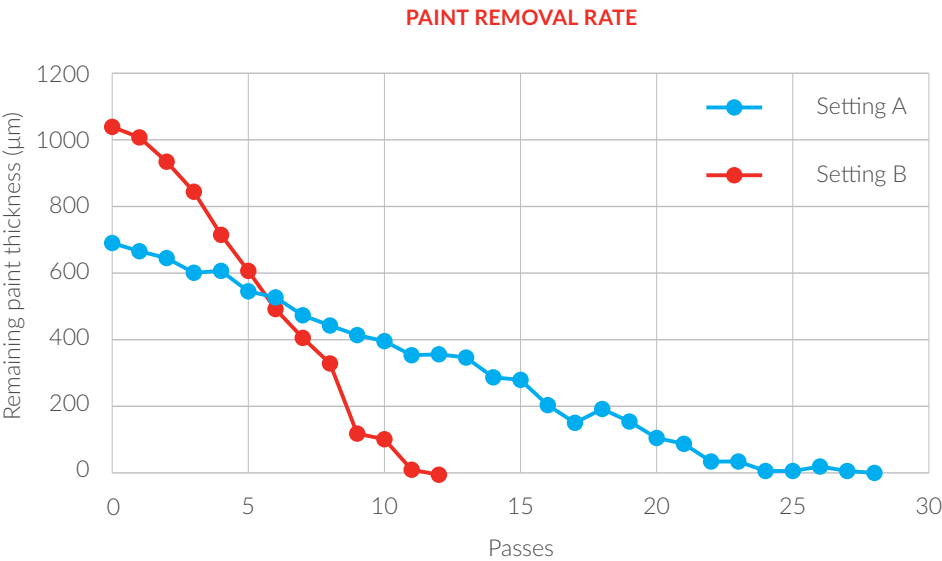


WHICH MACHINES ARE BEST USED FOR THIS?

QF-1000 & QF-2000

Average paint removed per pass:

- Setting A: 25  $\mu\text{m}$
- Setting B: 87  $\mu\text{m}$



WELD  
CLEANING

Experience has shown that current cleaning methods often leave behind oxide residue on welds, leading to increased corrosion risks over time. Today those oxides are removed by chemical processes, which cause a lot of problems in the painting process. Remains of silica contamination by the welding process itself, swimming at the surface of the weld. These silica remains can chip off after painting during the lifetime of the weld.

Until now, steel brushing was the standard solution. However, the automatization of this kind of process is extremely difficult, and the wear of the brushes is expensive. What's the solution? To remove the oxides, we can use our Low Power and Mid Power lasers, depending on the required cleaning speed, and track wideness.

Removing the silicas requires a two-step laser action. First, a small track (5-8 mm) passing at high pulse energy, followed by a softer wide track (25 mm) soft cleaning. In some cases, we need a complete automatic solution, in which the laser has to be programmed for complete 3D track cleaning.

	Speed of cleaning (m <sup>2</sup> /h)			
	50 W	100 W	200 W	300 W
Welding SST	1.8	3.6	7.1	7.1
Welding Steel	0.3	0.6	1.1	1.7



## WHICH MACHINES ARE BEST USED FOR THIS?

50W, 100W, 200W or 300W depending on the desired speed.

## How wide can the laser be at the surface?

This is completely dependent on the lens. For stainless steel welding with an F300 lens, the maximum width is about 60 mm. For welding on steel with an F250 lens this is about 50 mm. With F-theta lenses you can go even wider: FT-254 can be 100 mm wide and FT-330 can be 130 mm wide.

## What is the level of cleanliness?

- Stainless steel welding: oxides due to heating during welding are completely removed (discoloration is gone) + restoration of passivation layer that has been damaged by welding
- Welding on steel: oxides due to local heating during welding have been removed. Silicates that are anchored in the weld cannot be removed. Weld spatter cannot be removed with a laser either. Silicates and spatter can be limited or avoided by good process control of the welding process.

## Basic parameters

- Stainless steel welding: F300 lens has a 100% pulse energy, sometimes this is also possible with softer lenses (F400 or 500) and lower pulse energies.
- Welding on steel: F250 and 100% pulse energy.

# INLINE BATTERY CLEANING

In-line laser cleaning has emerged as a highly advantageous method for cleaning batteries during the manufacturing process. Batteries, whether they are used in electric vehicles, consumer electronics, or renewable energy systems, often require cleaning due to various factors such as the accumulation of dirt, contaminants, or residues from manufacturing processes. Keeping batteries clean is essential for ensuring optimal performance, safety, and longevity.

Traditional methods of battery cleaning often involve manual labor, chemicals, and mechanical abrasion. However, these methods have certain drawbacks. Chemical cleaning agents can be harsh and potentially damage battery components or compromise their protective coatings. Mechanical abrasion, such as brushing or scrubbing, can cause surface scratches or distort delicate

battery parts. These conventional cleaning techniques may also generate waste, release harmful fumes, and involve complex post-cleaning processes.

In contrast, in-line laser cleaning offers several advantages over traditional methods. Laser cleaning is a non-contact and non-abrasive technique that utilizes focused laser beams to remove contaminants from battery surfaces. This precise and controlled process ensures efficient cleaning.

Moreover, in-line laser cleaning is a highly efficient and automated process. It can be seamlessly integrated into the battery manufacturing line, ensuring continuous cleaning without disrupting the production flow. The automation aspect of laser cleaning reduces manual labor, minimizes human error,

and improves overall productivity. In-line laser cleaning systems can be programmed to perform repetitive cleaning cycles, resulting in consistent and reliable cleaning results. Additionally, in-line laser cleaning reduces the need for post-cleaning processes such as rinsing or drying.

In conclusion, in-line laser cleaning offers numerous advantages over traditional battery cleaning methods. Its non-abrasive, chemical-free, and precise cleaning action ensures optimal battery performance, while its automated and efficient nature enhances productivity. The ability to eliminate post-cleaning processes further strengthens its appeal. As battery technology continues to advance, in-line laser cleaning will play a crucial role in ensuring clean, reliable, and high-performing batteries in various industries.



# SOFTWARE





## CLEANSWEEP

CleanSweep is a P-Laser in-house developed software program which controls the laser. With this program, jobs can be created and adjusted. CleanSweep can also provide you with more information about your laser, when connected. It gives you more clarity about the status, emission hours and temperatures from the laser.

## CLEANMARK

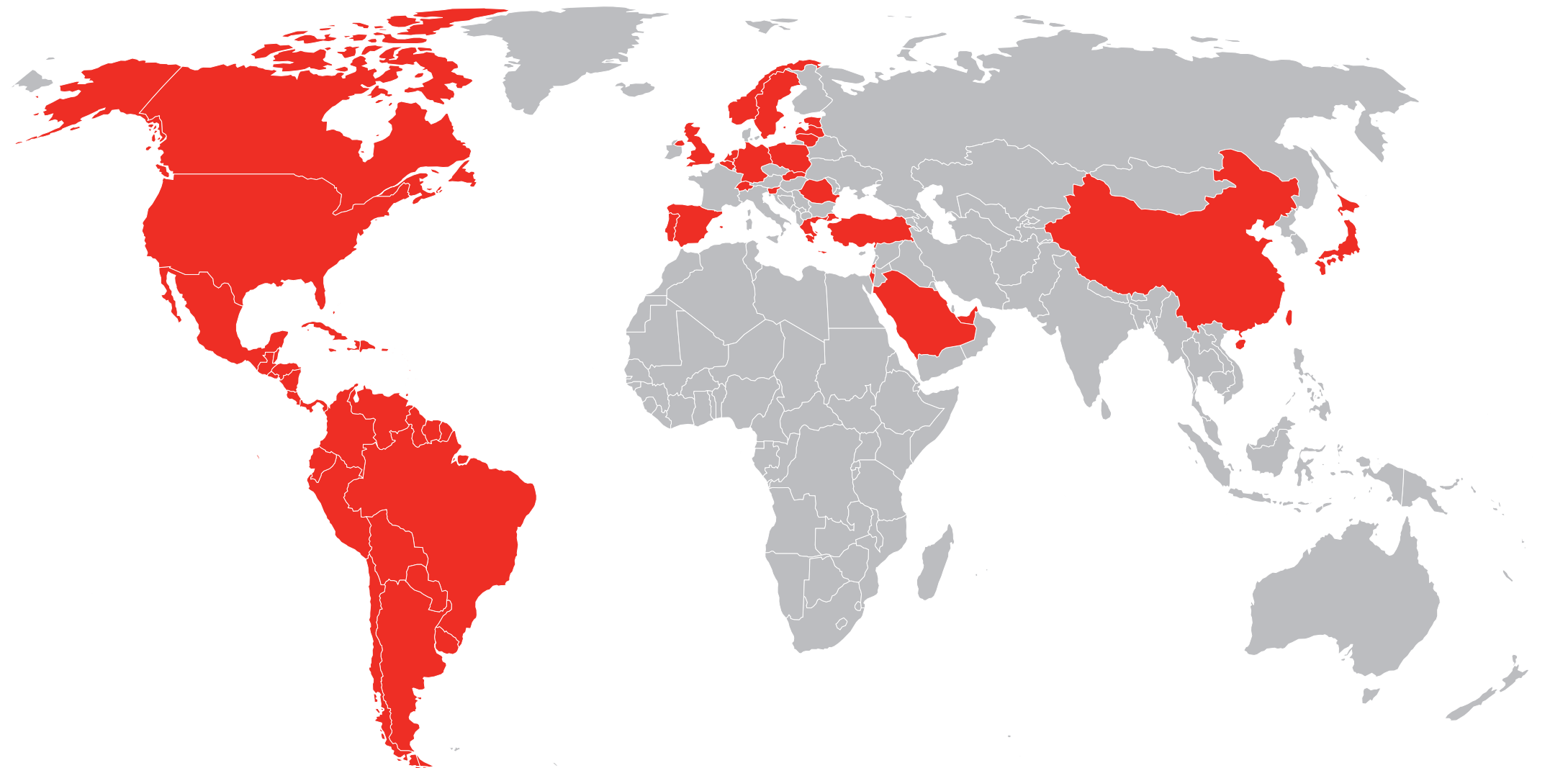
CleanMark is a marking software that can be used on all P-Laser devices. It turns your cleaning laser into an efficient marking laser. The software can mark text, custom figures, QR codes, data matrixes, pictures and DXF files to your liking.





## P-LASER DISTRIBUTORS AND HEADQUARTERS WORLDWIDE

Join P-Laser's global network! Explore our map to see our extensive presence worldwide. We are actively seeking local partners in certain areas.





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