

DE-CONTAMINATION WITH LASER LIGHT

LASER CLEANING TECHNOLOGY

Clean-Lasersysteme GmbH

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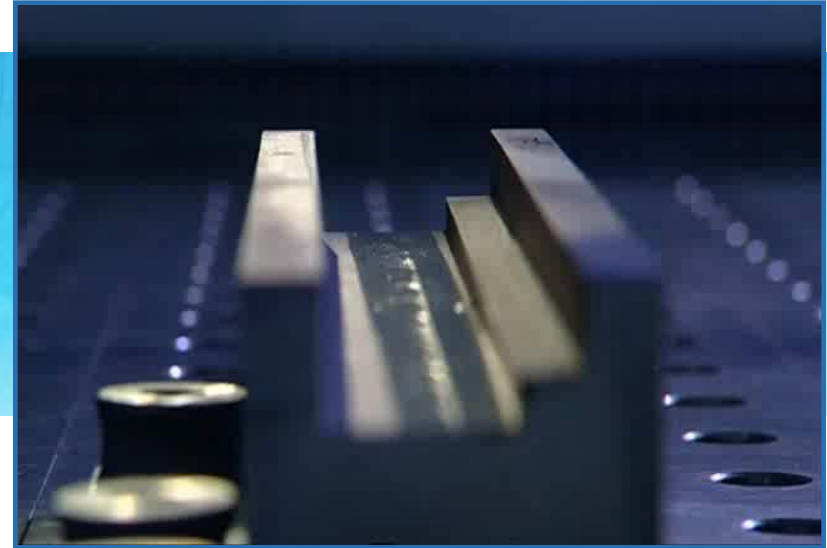
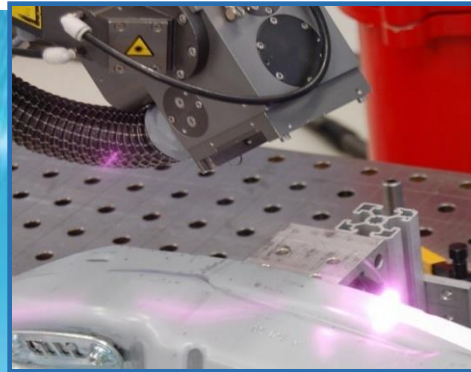
CONTENT OF THIS PRESENTATION

- Overview Clean Lasersysteme
- Laser ablation
- Industrial Applications
- De-Cont Applications



Clean-Lasersysteme GmbH OVERVIEW INTRODUCTION

SYSTEM MANUFACTURER: CLEAN-LASERSYSTEME, GERMANY

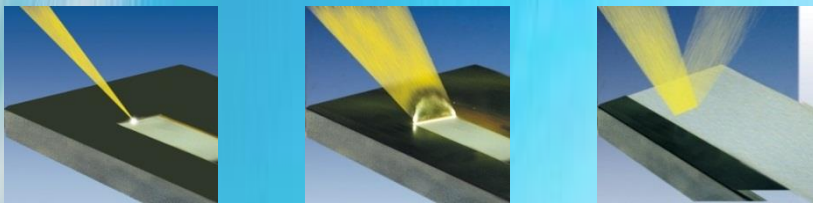
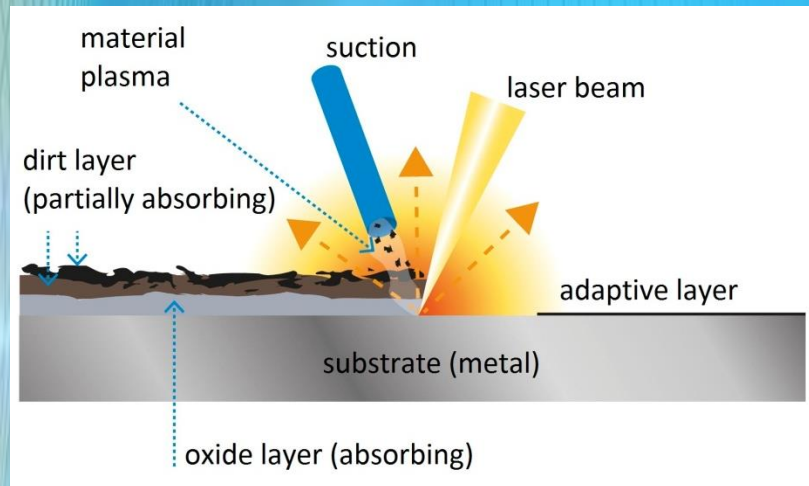


- Founded 1997
- Location: Herzogenrath (near Cologne), Germany
- Certification: DIN EN ISO 9001
- Optical production in clean room environment
- 2 owners (acting as CEO's)
- Employees 2013: > 60 well qualified experts, ~ 30% engineers
- Accumulated sales: >375 devices & systems
- Turnover 2011: ~ 6,5 Million Euro / 2012: ~ 10,0 Million Euro
- 15 Distribution partners in 14 Countries

Deutscher
Umweltpreis

FUNCTIONAL PRINCIPLES OF REMOVING DIRT LAYERS

BY LASER RADIATION



Two physical effects:

- Coating layer is vaporised (ablation by sublimation)
- Ablation by thermally induced pressure

ABLATION PRINCIPLE

- Coating layer is removed by absorbing the focused laser spot
- Very powerful but short laser pulses cause very little thermal influence on the base material
- Blank base material reflects laser radiation, ablation process stops



Verfahrensprinzip
des
LaserClean-
Prozesses

SELECTIVE LASER DE-COATING

FOR DECONTAMINATION OR ORGANIC MATERIAL, DUST AND OXIDES

Top down-decoating with laser

high contamination

significant contamination

low contamination

minimum contamination

substrate

ADVANTAGE TOP DOWN REMOVAL:

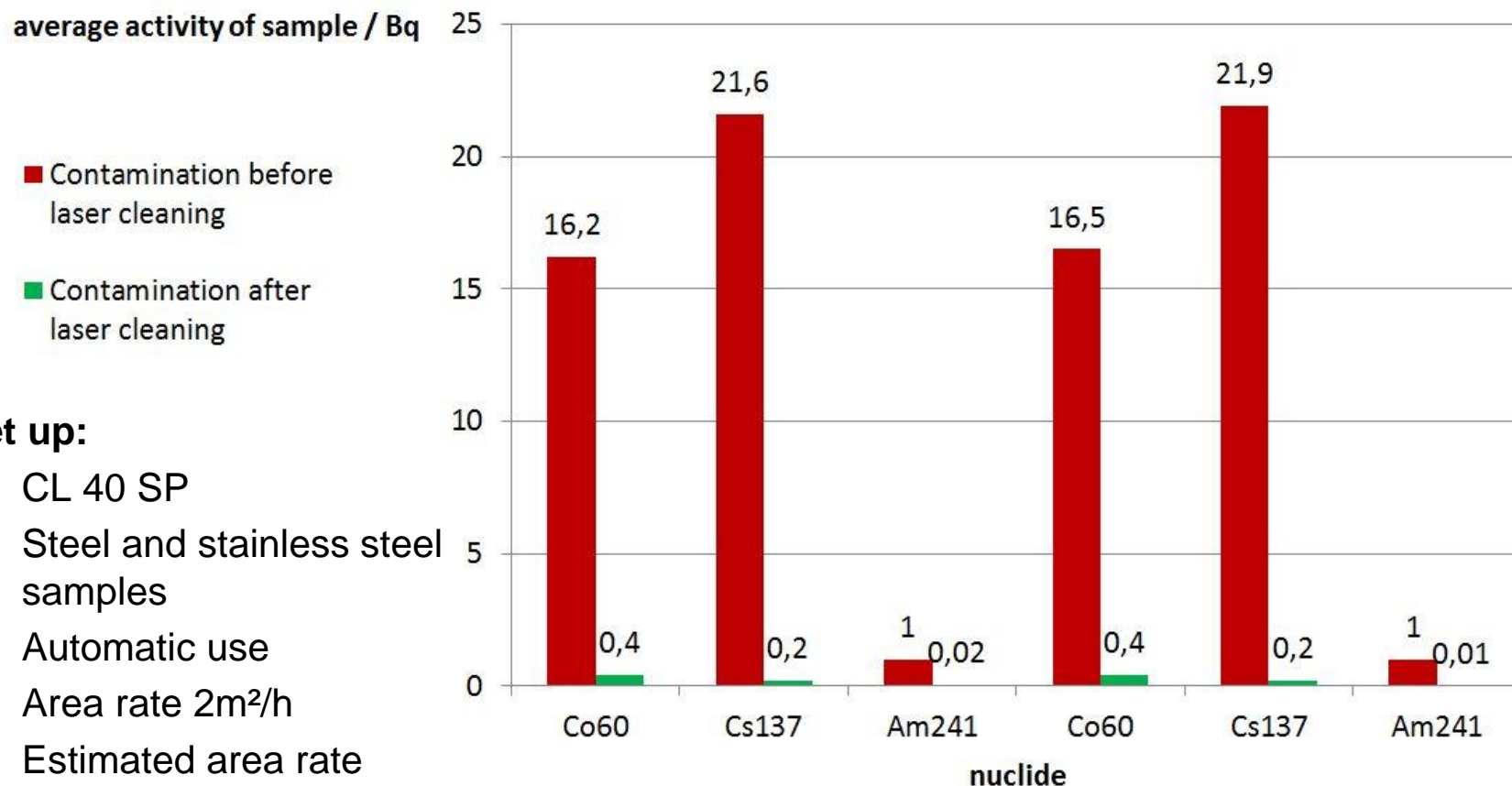
- Highest degree of contamination in top layers (e.g. corrosion, oxides, dust, paint...)
- Laser ablation speed is proportional to thickness
- Reduction of waste by only removing the upper layer

LIMITS OF THE PROCESS:

- reflecting or transmitting substrates
e.g.: concrete, plastics

BASE: SCIENTIFIC RESULTS

Contamination after laser cleaning



Set up:

- CL 40 SP
- Steel and stainless steel samples
- Automatic use
- Area rate 2m²/h
- Estimated area rate for CL 500 up to 20m²/h

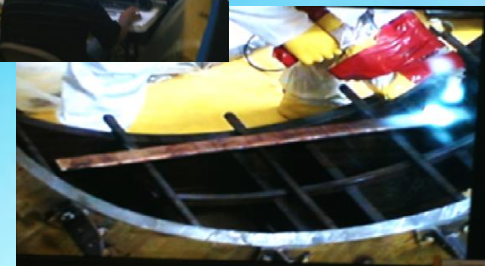
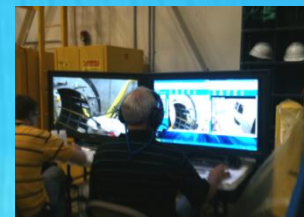
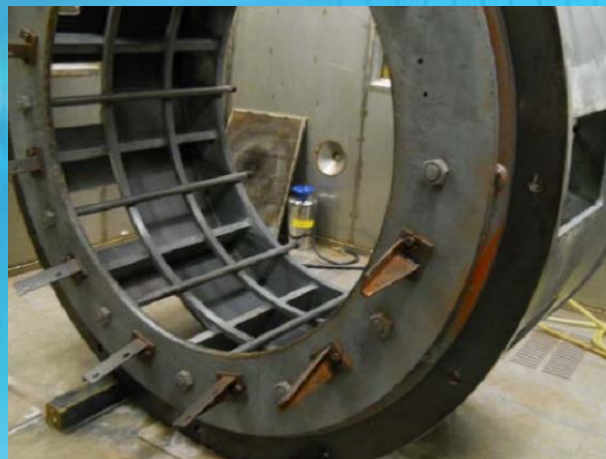
Results of a diploma thesis In cooperation with Forschungszentrum Jülich, FH Aachen, sat.Kerntechnik GmbH and cleanLASER

SELECTED APPLICATIONS



USA PROJECTS

DECONTAMINATION PUMP AND MOTOR COMPONENTS



Results:

Steel

- Decont from 40.000CPM to 100-200CPM,
- CL 1000, strong parameter, 2 wipes,
- Will replace a grid blasting process

Copper

- Decont from 200.000CPM to 200-240CPM,
- CL 1000, strong parameter, 2 wipes,
- Needs an chemical post-treating

Next step automation of processes

Project partners commercial company in cooperation with Adapt Laser system April/May 2012

ASIAN PROJECTS

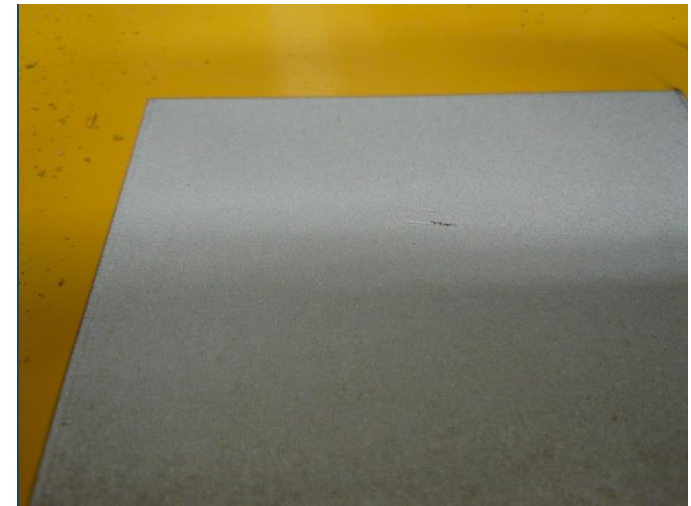
DE-CONTAMINATION



Laser devices sold in Japan / Taiwan for nuclear de-contamination

Typical application fields:

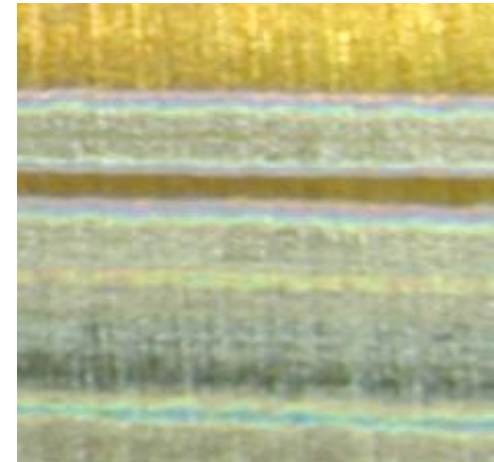
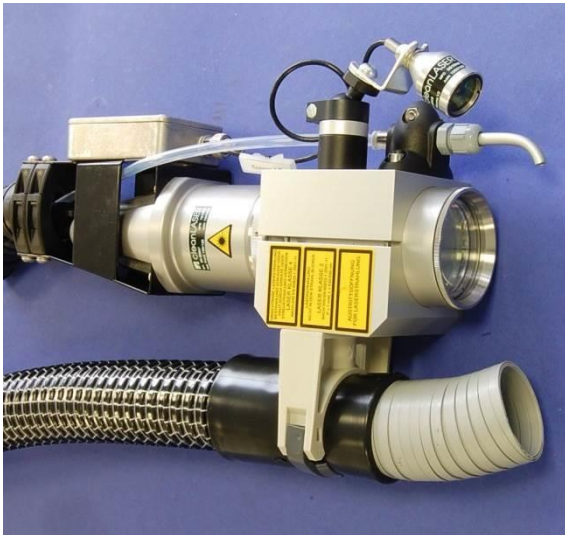
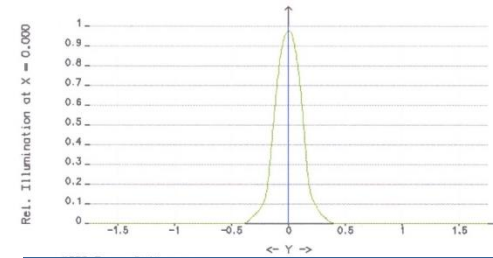
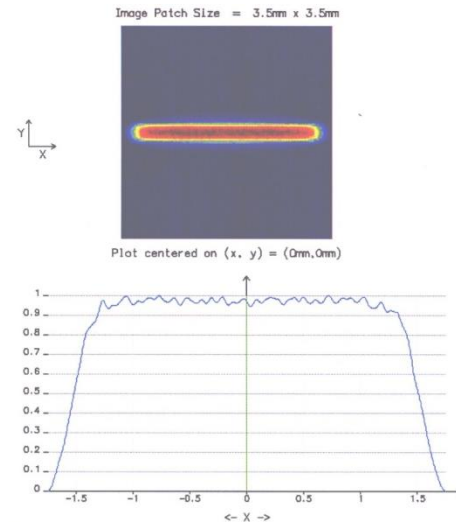
- Ablation of oxides (30cm²/s @ CL 500)
- Rust removal (15cm²/s @ CL 500)
- Paint removal (10cm²/s @ CL 1000)



cleanLINE for HOT AREAS (NO HUMAN ACCESS)

Field of Application:

- Simple optics
- Radioactive areas
- Removal of USIBOR
- Automatic use
- Maximal size depending on application
Max. < 3mm x 0.5 mm
Typ. < 1.0mm x 0.3mm



CLEANING OF MOLDS WITH LASER-LIGHT – PURE SUSTAINABILITY

ENVIRONMENTAL ASPECTS AND ECONOMICAL ASPECTS IN COMBINATION



Besides economical aspects, using cleanLASER means:

- Energy consumption less than 7kWh (up to 85% less than other methods, including Media manufacturing)
- No transports (for Ice/other Media) required
- No noise, no allocation of dirt
- Reduced CO₂- emissions
- No waste
- Lower running costs (typically <2€/hr)
- Affordable investment
- Cleaning time comparable to conventional blasting methods (ice/sand)
- No erosion
- No mechanical forces, no damage (if properly applied)
- Very compact design of the laser units
- Flexible and easy to use
- Preferred applicable on metal substrates



Invitation to join future cleaning

THANK YOU!

DANKE!

www.cleanlaser.de

