Concept Laser GmbH · An der Zeil 8 · D 96215 Lichtenfels

Lichtenfels, 07.12.2016

Quotation No.

According to our general sales- and delivery terms, please find following the requested quotation for our M2 cusing system:

Concept Laser M2 cusing System:

1.0. Basic Machine

Basic machine system M2 cusing, welded steel frame design, for processing **reactive** and **non reactive** powder materials using the LaserCUSING®-technology.

Process module, handling station, powder handling and inert gas filtration performed under **ATEX Guideline II** (category 3D, Zone 22) for flammable or explosive materials.

Sealed process chamber with redundant oxygen online analysis. In case of sensor failures the build process can still be finished without need for a fire extinguishing system.

Build envelope: 250 x 250 x 280 mm (x, y, z)

1.1. Laser and Optic

200 Watt System

Diode pumped Yb-fibre laser, 1 x 200W

Scan system	2-axis scan system, dynamic Interface board SCANLAB RTC® 4
Scan head	1 x SCANLAB hurrySCAN® 20
	Scanning system with integrated temperature drift correction.
Spot velocity	max. 6 m/s
Varioscan	SCANLAB varioscan$_{de}$40i
Focus diameter	50 – 500µm (typical weld seam width 70 - 150 µm)

400 Watt System

Diode pumped Yb-fibre laser, 1 x 400W

Scan system	1 x digital 3-axis scan system, dynamic Interface board SCANLAB RTC® 5
Scan head	1 x SCANLAB intelliSCAN® 20 Scanning system with powerful control algorithm and interface capabilities for diagnostics and communication.
Spot velocity	max. 6 m/s
Varioscan	SCANLAB varioscan$_{de}$40i
Focus diameter	50 – 500µm (typical weld seam width 70 - 150 µm) Focus system with highly dynamic and precise positioning of the laser focus. Positioning within milliseconds allows for high speed scanning of up to 6 m/s.

1.2. Recoating system

Dynamic recoating system with fixtures for 3 different recoater blades for an optimal quality of the build jobs:

Steel blade - for massive geometries and even powder coating

Rubber blade - for fine detailed geometries with delicate support structures

Plastic blade - for improved accuracy with complex geometries

1.3. Filter device (ATEX II Water V2)

The extraction and filter device is used to circulate and clean the inert gas during the LaserCUSING® process. The inert gas is supplied to the extraction and filter device via fixed metal pipes in a closed circuit.

The inert gas is filtered in the process and is therefore purified to remove soot and metal powder particles with two cartridge filters. The cartridge filters are automatically cleaned and the filter dust is collected in the collecting container. The extraction and filter device is also suitable for extracting the smoke from build processes involving reactive metal powders and it has the appropriate explosion protection. The purified inert gas is then returned back to the process chamber.

The unit consists of 3 components, 1 motor unit with an inert gas buffer for self-cleaning and 2 filter units which are operated alternately.
Prior to the exchange of the filters, the filter units which have been used are flooded with water. The extracted soot reacts with the oxygen in the water (oxidation) and is thereby passivated. The filter can be exchanged safely with no risk to the operator.

The filtering unit is completely integrated into the machine and reduces the footprint significantly. The filter cartridges are 10m² each and will allow long running times before a change is needed. A second filtering unit is ready for a fast and safe filter exchange with minimum machine down time.

- two moveable filter housings with two filter cartridges, each 10m² filter area (high endurance)

1.4. Handling of reactive powder materials

To remove the parts after a build, the process and feed chamber is moved into the inerted handling station (inside the machine). The parts can now be removed with a glove box system without contaminating the powder with oxygen. The powder can be reused to almost 100%.

After the build the excess material is manually removed in an inert atmosphere into the overflow container, where it will fall into bottles or a container.

The container is removed with a handling device and moved to an external sieving station. Also the sieving station is operated under an inert atmosphere. The powder is sifted automatically and transported back into the container.

The machine can be loaded again by using the transportation and lifting device from the top. This solution offers a much bigger sieving area and therefore a faster sieving time. The machine is ready for the next job in a much faster time frame.

The operator has no direct contact to the powder.

1.5. LCM+ Software (included in machine delivery):

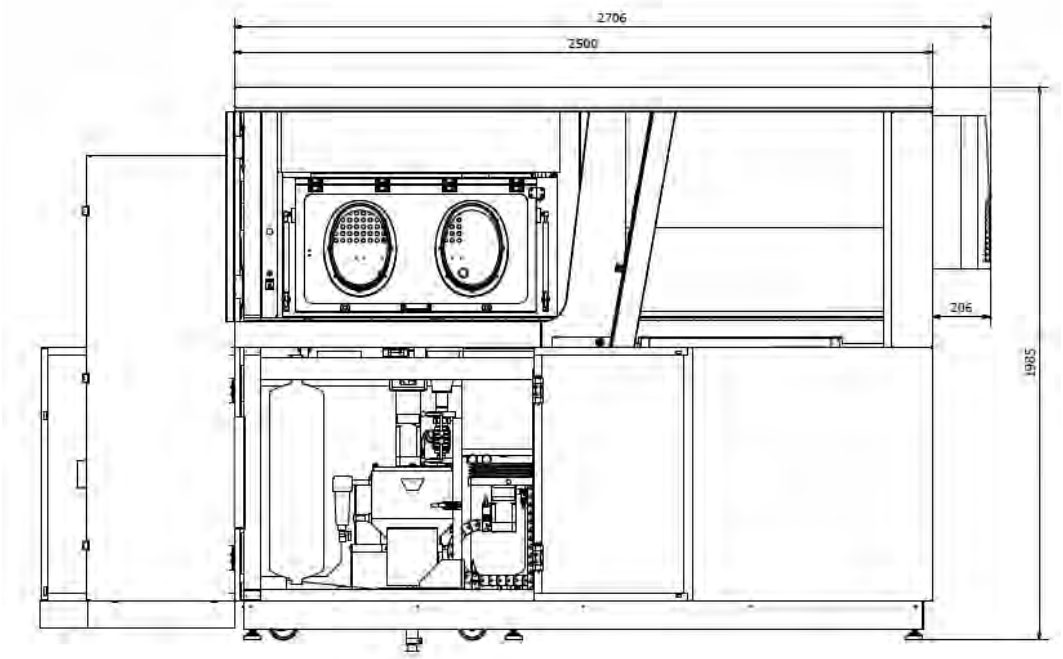
- Import and visualisation of slice data of all common slicing modules
- Generating of exposure vectors by means of patented exposure strategies using parameter data bases
- Real-time monitoring of all important process data including QM atmosphere
- Report generation after ending of the building process due to the software module QM documentation
- Export function for archiving all building jobs
- Building time calculation prior to the build process
- Email notification (via SMS optional) when build process is interrupted or finished
- Intuitive user interface, multilingual (German, English, French and Italian)
- Easy change of own developed parameters due to import / export function

1.6. Peripherals (included in machine delivery):

- Container for filter cartridges
- Second filter housing
- Lifting and transportation device for material handling
- 1 material exchange container made of stainless steel
- 2 build platforms steel 250 x 250 x 25 mm
- Hand demagnetising device including Gaussmeter
- Compressed air file (Turbolap TTL-07) for the manual finishing of parts
- Cleaning and handling kit including: hand sieve, brush, shovel, rubber gloves and filter mask
- 3 different recoater blades (rubber blade, plastic blade and steel blade)
- ESD safety kit
- PSE basic equipment including: 2 pcs. disposable protective suit size XL, 2 pcs. heat protection gloves, 2 pcs. full face breathing mask size M, 4 pcs. particle filter for breathing mask

Technical data:

Weight of machine:	approx. 2300 kg
Dimensions (W x D x H):	(2706 x 1818 x 1985) mm
Voltage:	3/N/PE AC 400V, +-10% 50HZ, 32 A-CEE Plug
Power consumption:	max. 7,4 kW
Pressure air:	min. 5 bar oil free
Inert gas:	Nitrogen or Argon (consumption 0,6-0,8 m^3 / h)
Argon:	for the production of parts in titanium
Recommended ambient temp.:	15 - 35°C
Maximum temperature change:	2°C / h
Recoater:	speed 400mm/s
Z-Axis:	speed 10mm/s, max. 1000mm/s
Positioning accuracy:	+/- 0,1µm (traveling distance 280mm
Repeat accuracy:	+/- 3-5 µm smallest step +/- 1 µm
Industrial Machine PC:	Intel Core i7 3610QE, 2.3 GHz 4 Cores 16GB RAM 512GB SSD Samsung 840Pro Microsoft Windows 7 Ultimate 64-bit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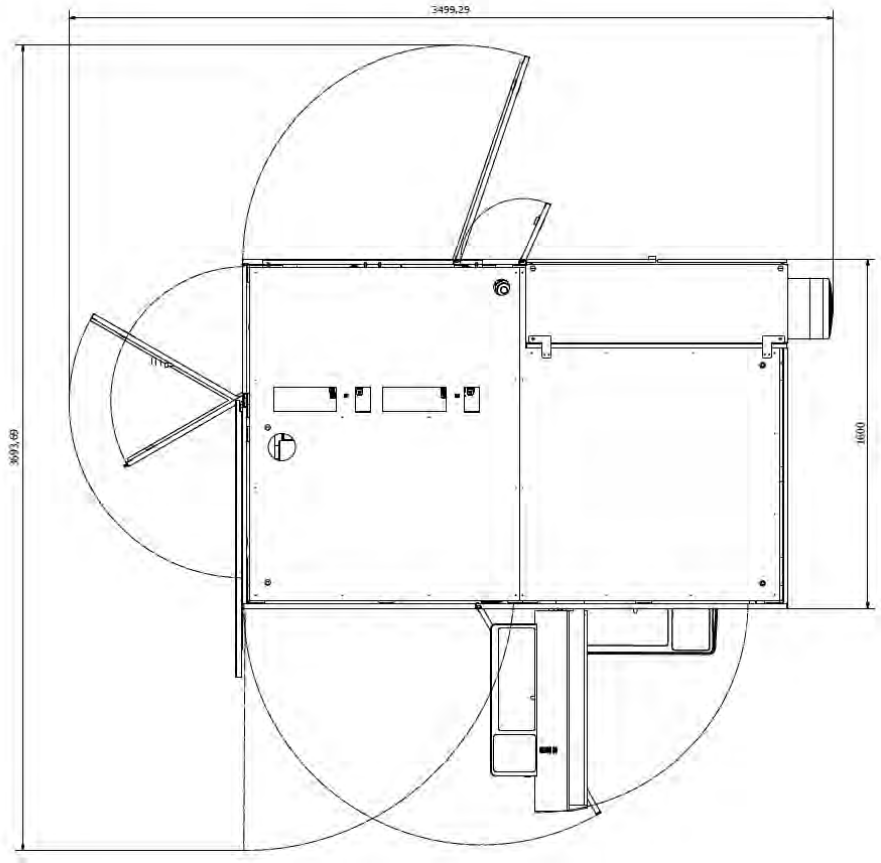
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2. Software

2.1 Materialise Magics

The Magics software, which has a modular structure, offers all of the tools required for the LaserCUSING® process and can be expanded and adapted to meet customer requirements. The standard version includes the modules RP (basic module), SG (Support Generator), Ctools and CL Slice module (generation of CLS slice files). Examples of options that are available are specific import filters for all customary 3D formats and the advanced support module (SG+) and the structure module for generating internal or external structures on the component.

Magics RP Basic
Magics allows the complete processing of STL files including:

- visualisation, measurement and processing of STL files
- repair of STL files
- cutting STL files, perforating, extruding surfaces, generating hollow bodies, generating an offset
- Boolean operations, triangle reduction, smoothing, labelling
- nesting, collision detection
- documentation, applying textures

Support Generation (SG) module
Magics SG module allows quick, simple and automated creation and processing of a wide range of different support structures.

C-Tools and Slice module
The Slice module is designed for generating CLS data on the basis of STL data. C-Tools generates the slice contours and the patented island structure for LaserCUSING® machines in a CLS format.

2.2 3Shape CAMbridge™ Software (Version Concept Laser)

CAMbridge™ enables fully automated manufacturing of frameworks, crowns or copings for the LaserCUSING® process by automatic preparation of the completed design. The components are automatically oriented and placed optimally, followed by a unique support generation with ID tags for easy identification.
The output of the data to the Concept Laser system is generated in CLS format (slice data; directly usable by the machine), according to the layer thickness selected in advance.
Input formats:

- STL files from any CAD/CAM-programmes and scanners
- Automatic preparation of data from 3Shape DentalManager™ / DentalDesigner™

The CAMbridge™ Software contains a user licence for 12 months. After expiration a new user licence has to be purchased.

3. QM Systems

The following systems are included in machine delivery:

3.1. QM RT atmosphere

Redundant process control of the oxygen concentration in the process gas. Control of the filter status including automatic cleaning function.

3.2. QM documentation

Software module for analysis and reporting after the build process. Access to all data of the real time QM modules.

The following systems are available as options:

3.3. QM RT meltpool

Real-time quality management system integrated into the optical path. The integration will be done with the delivery of the system. Monitoring of the build process with several thousand exposures per second. Real-time analysis of data of the weld seam including documentation. Preparation for future online error detection and control.

3.4. QM powder

External powder sieving station with large sieving area and possibility to use mesh sizes of approx. 45µm. Standard sieve 63µm. Material is delivered in containers to the sieving station and sieved into a second one. Sieving under inerted atmosphere possible.

1 material exchange container out of stainless steel included.

Technical data:

Mesh size:	45-63µm
Inert gas:	Argon or Nitrogen, 5bar
Tumbling sieve:	400mm diameter
Size:	1050 x 995 x 1600 mm
Weight:	350kg
Power:	3 P/N/PE AC 400V, ±10%, 50Hz-60Hz

3.5. QM RT coating

The QM coating module monitors and analyzes the powder layer applied during a build process. To do this, for each powder layer an image is taken before and after the layer application and evaluated by the associated analysis software.

If a defective layer application is detected, the QM coating module can trigger renewed layer application or an increase in the powder delivery.

4. Materials

Concept Laser powder materials, which are developed for the LaserCUSING®-process. The chemical composition of the materials as well as the shape and size distribution of the powder particles are specially tailored for the technology and the process. All Concept Laser powder materials are 100% reusable for successive processes. There is no need to add fresh material.

Reactive powder materials

4.1 Material CL 30AL, aluminium alloy (AlSi12)
Powder material for the production of parts

4.2 Material CL 31AL, aluminium alloy (AlSi10Mg)
Powder material for the production of parts

4.3 Material CL 41TI ELI, titanium alloy (TiAl 6V4 ELI)
Powder material for the production of parts. Tensile strength approx. 900 N / mm^2

4.4 Material CL 42TI, Commercially Pure Titanium (grade 2)
Powder material for the medical industry as well as in lightweight components for the aviation industry

Non reactive powder materials

4.5 Material CL 20ES, stainless steel 1.4404 (316L)
Powder material for the production of acid- and corrosion resistant parts or tool components for pre-production tools. Tensile strength approx. 650 N / mm^2, hardness approx. 220 HB 30

4.6 Material CL 50WS, hot work steel 1.2709 (Maraging Steel)
Powder material for the production of components as well as tool components of production moulds for plastics and pressure die casting of light metal alloys.
Plastic injection molding tools:
Tensile strength 1.200 – 1.400 N / mm^2, hardness approx. 40 HRC
After heat treatment 1.600 – 1.900, hardness 50 - 52 HRC N / mm^2
Die casting molds for light metal alloys
Tensile strength 1.200 - 1.400 N / mm^2, hardness approx. 40 HRC
After heat treatment 1.500 - 1.800 N / mm^2, hardness 46 - 48 HRC

4.7 Material CL 91RW, hot work steel
Powder material for the production of parts as well as tool components of production moulds for plastics. Corrosion resistant (> 12,5 % Cr),
Certificate for packaging plastic parts and plastic parts for medical use
Tensile strength approx. 1.700 N / mm^2, hardness 48 - 50 HRC

4.8 Material CL 92PH, precipitation hardening stainless steel (17-4PH)
Powder material for the production of functional parts or medical instruments

4.9 Material CL 100NB, nickel-based alloy / Inconel 718
Powder material for the production of highly heat resistant components

4.10 Material CL 101NB, nickel-based alloy / Inconel 625
Powder material for the production of components for high-temperature applications

Dental powder materials

4.11 Material remanium® star CL, CoCr alloy
For dental products according to DIN EN ISO 9693 / DIN EN ISO 22674, specially produced by Dentaurum for the Concept Laser machines

4.12 Material rematitan® CL, titanium alloy
For dental products according to DIN EN ISO 9693 / DIN EN ISO 22674, specially produced by Dentaurum for the Concept Laser machines

5. Installation and Training

5.1 Installation at customer site
Contains machine- and laser introduction, travel and hotel cost excluded.

5.2 4 days basic training in Lichtenfels, or at customer site, for 2 persons

- Technical data M2 cusing
- Safety instructions
- LaserCUSING® theory
- Machine design M2 cusing
- Data preparation
- Concept Laser software
- Machine usage
- Maintenance and service
- Troubleshooting
- Powder exchange and handling of reactive powders

5.3 2 days CAD training for the design of cooling channels, for 2 persons

- Where to use LaserCUSING® cooling
- Characteristics of LaserCUSING® cooling
- Guidelines for the hybrid manufacturing
- Design rules for surface cooling
- Design rules for bypass or parallel cooling
- Material combinations for hybrid manufacturing
- Flow and pressure loss simulations
- Hardening and annealing
- Documentation

6. Options

6.1 Nitrogen generator N2 Midigas 2
90l buffer vessel included. Connection to an existing compressed air outlet.

Inlet pressure:	6-13 bar, oil free
Voltage:	230V, 3,15A 50/60 Hz
Dimensions:	1034 x 450 x 471 mm
Weight:	98 kg
Noise level:	<80dB (A)

6.2 Buffer vessel 1000l zinc plated (only for EU)

6.3 NA 7 – 11 CL EU (US version available)
Wet separator in accordance with directive 2006/42/EG
(required for Mlab, Mlab cusing R, M1, M2 cusing)

This small wet separator vacuums the dust loaded air and guides it into a collecting tank which is filled with liquid. In this collecting tank air, dust and liquid are swirled. During this process the dust attaches to the liquid and forms a sediment which sinks downward. The full collecting tank can be removed easily in order to dispose of the sediment.

- Avoidance or limitation of the forming of an explosive atmosphere
- Avoidance of effective sources of ignition
- Limitation of the effect of a probable explosion to a harmless level
- Improving the safety and health protection of workers potentially at risk from explosive atmospheres
- Avoidance of operating error by an integrated electronic water level gauge
- Only one operator is required for the cleaning of the wet separator

Technical data:

Supply voltage EU:	230V / 50Hz
Motor power:	1,1 kW
Protection class:	IP65
Dimensions:	705 x 488 x 755 mm (l x w x h)
Noise level:	<70 db (A)
Air flow rate:	130m3/h
Uninterrupted vacuum:	145 mbar / Short period 235 mbar
Liquid volume:	7 Liter
Weight:	95kg

6.4 Clamping System (EROWA PowerChuck P 150)
Pallet system for the completion of conventionally pre manufactured components in the M2 cusing. Integration of the chuck into the machine table, including pneumatic clamping. 1 EROWA pallet P150.
Alternative systems are possible (e.g. System 3R)

6.5 1 building plate titanium, 250 x 250 x 25 mm

6.6 Wear parts kit including: 1 pc. safety glass, 2 pc. filter cartridge ATEX 10m², 1 pc. steel blade, 1 pc. plastic blade L-shape, 1 pc. rubber blade Y-shape, 1 pc. filter mat

6.7 Microblasting system, Peenmatic 620S
Two different blasting media (25kg each) are included and will be adjusted to the customers application.

6.8 Powder exchange container (Master)
Stainless steel container with gas dense design including powder level window. Container can be opened for cleaning and can be also used for other materials. Per material class two containers are recommended.

6.9 Powder exchange container
Stainless steel container with gas dense design. Container is closed. Per material class two containers are recommended.

6.10 Powder container shelf (without containers)
Ergonomically designed storage system made of steel for easy storage of powder containers.
Storage capacity of four powder containers.

Size:	1150 x 1220 x 870 mm (H x W x D)
Weight:	250 kg
Work load:	500 kg

6.11 Semi-automatic powder sieve
Pneumatic driven powder sieve, which can be mounted onto the storage chamber. The connection will be performed through a compressed air outlet, which is integrated in the machine. The frequency for the sieving process will be selected via the machine software.

Sieving area:	170 x 140mm
Drive:	Pneumatic
Mesh size:	100µm (60µm optional)
Frequency:	0 - 50Hz

6.12 Extended warranty (laser resonator) / per year
The warranty for the resonator can be extended for a maximum of 3 years to a total of five years (2 years are included in the system purchase). Includes cost for replacing the resonator, cost for travel and labour are not included.

6.13 Nabertherm N 41/H furnace
Electrically heated muffle furnace with brick insulation for heat treatment of built parts under inert gas atmosphere to obtain thermally stress relieved parts. Mains voltages from 400V, 50Hz. The package includes the N 41/H furnace, controller P300, protective gas box, manual gas system, charging plate, charging trolley, temperature indicator, hardening foil, hardening tongs, gloves.

Size furnace chamber:	350 x 500 x 250 mm (W x D x H)
External dimension:	840 x 1160 x 1320 mm (W x D x H)
Volume:	41liters
Weight:	260kg

6.14 Platform Heating System
Heating system up to max. 200°C. Isolated platform with slightly reduced build envelope. Available build chamber 220 x 220 x 250 mm. Installation by service technician necessary.
The system is not reversible by operator and does not work in combination with a reference clamping system.

CONCEPTLASER

QM powder

Automatic Sieving Station
Operating Manual

Version: 1.0.15

Other relevant documents:

The following documents which also apply together with this operating manual are enclosed in the annex to this operating manual:

- Safety data sheets
- "Safe handling of reactive materials in the LaserCUSING® process" document

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List of contents

1. General information

Read the operating manual!

To ensure that the machine is used safely and correctly, the operating manual and all other documents accompanying the product should be read carefully.

1.1. Purpose of the operating manual

This operating manual provides information about safety, the structure and function, operation, and maintenance of the sieving station.

This operating manual is intended for the operator and user of the machine and must be read before the sieving station is first put into operation.

The machine operator is strongly urged to get users to confirm in writing that they have taken note of and are aware of the safety instructions which are listed.

If this operating manual is lost, the operator or user of the machine is requested to ensure that it is replaced.

It can also be used as a basis for training the corresponding personnel.

1.2. Storing the operating manual

This operating manual (incl. the other relevant documents) is an integral part of the sieving station and should always be kept readily available near the sieving station!

The user of the sieving station must be able to gain access to the operating manual at any time.

1.3. Conventions of presentation and explanation of symbols

Safety notices

This manual contains warnings and notices which are needed to ensure that the sieving station is handled safely. The safety notices contain information about the danger, the possible consequences, and the emergency response measures. A distinction is made between the following hazard classes:

DANGER

DANGER indicates a dangerous situation which will result in death or serious injury if instructions are not heeded.

WARNING

Warning indicates a dangerous situation which may result in death or serious injury if the warning is not heeded.

CAUTION

Caution indicates a dangerous situation which may result in slight to serious injuries if the warning is not heeded.

NOTICE
Notice indicates information and useful tips.

ORDER
Order indicates a situation in which personal protective equipment is required.

List of warning symbols used

The following safety symbols are used in this operating manual:

	Warning about a danger spot		Warning about potentially explosive substances
	Warning about dangerous electrical voltage		Warning about harmful and irritant substances
	Warning about flammable substances		

Typographical conventions

The following typographical conventions are used in this operating manual:

➲	Prompt to perform an action
1. 2.	Prompt to perform a sequence of actions in a specific order
⇨	Indicates the consequence of an action
– , •	Bullet point
Italics	Indication of cross-references

1.4. Limitation of liability

All specifications and notes provided in this manual were compiled taking due account of the applicable standards and regulations, the state of the art, and our many years of knowledge and experiences.

In the following cases, the manufacturer cannot accept any liability or provide any guarantee for damage:

- Failure to follow this manual
- Non-designated use of the sieving station
- Use of non-trained personnel
- Unauthorized structural modifications
- Technical modifications
- Use of non-recommended original spare parts
- Defective monitoring of parts which are subject to wear and tear.
- Incorrect implementation of maintenance and repair work
- Operation of the machine when there are defective safety and protective devices or safety and protective devices which have not been installed properly.

The obligations agreed in the delivery contract, the general terms and conditions of business, as well as the delivery terms and conditions of the manufacturer and the statutory regulations valid at the time that the contract is concluded apply.

1.5. Copyright protection

Changes to this documentation or the product described which involve technical advancement are reserved. This documentation describes the condition of the product at the time of publication and may not necessarily match future versions of the product.

2. General safety notices

This section provides an overview of all the important aspects of safety for protecting people and ensuring safe and troublefree operation.

Read safety notices!
All users are obliged to read these safety notices and to follow them at all times!

2.1. Designated use

The sieving station is designed to be used exclusively for the process of sieving specific metal powder types/varieties from the company *Concept Laser GmbH*.

Designated use includes the following:

– Sifting out foreign bodies, coarse grain from metal powders from the company *Concept Laser GmbH.*

2.2. Improper use

DANGER

Danger posed by improper use!
If the Lasercusing machine is not used in the designated way, this may lead to dangerous situations.

↗ Use the LaserCUSING® M2 cusing machine only for assignments which correspond to the designated use.

Any other use or use which goes beyond this is deemed to be non-designated. The operator or user of the sieving station is responsible for all damage which is caused as a result of non-designated use!

The following processes must not be carried out using the sieving station under any circumstances and are deemed to be improper use:

– The use of metal powder types/varieties other than those authorized by the company *Concept Laser GmbH*.

– The use of an inert gas other than argon for the sieving process.

Claims of any type on account of damage caused by non-designated use are excluded.

2.3. Basic safety notices

The following section lists residual risks which can be presented by the sieving station even if it is used in the designated way.

To reduce the risks of personal injury and material damage and to avoid dangerous situations, the safety notices which are listed here and the safety notices in the subsequent sections of this manual must be followed.

Basic safety measures during normal operation

The sieving station may only be operated by authorized people who have been trained to do so and are aware of, understand and work in accordance with the operating manual.

The sieving station may only be operated if steps have been taken to check and ensure that:

- ↗ all safety devices have been installed and are in good working order.
- ↗ there are only authorized people positioned within the working area of the device.
- ↗ defects and faults are reported to the line manager immediately!
  The sieving station must stop being used until the defect has been rectified.
- ↗ the sieving station is operated in perfect condition.

Basic safety measures during maintenance and repairs

Maintenance and repair measures for the individual components in this operating manual must be followed.

Also follow the operating manuals for the external components, in the other relevant documents.

Note the following for all maintenance and repair measures:

- ↗ Open or remove the protective devices only immediately before the work is due to begin.
- ↗ Never leave the device unsupervised during the work!

⚠ CAUTION

Warning about personal, material, and environmental damage!

Use the sieving station exclusively for the process of sieving specific metal powder types/varieties from the company Concept Laser GmbH.

- ↗ The safety notices in the operating manual must be followed at all times.
- ↗ Do not make any changes to the sieving station:
- ↗ If any unauthorized changes are made, the declaration of conformity of the sieving station shall become invalid!

2.3.1. Dangers posed by electrical energy

⚠ DANGER

Danger posed by dangerous electrical voltage!

If you touch live parts, there is an immediate danger to life posed by electric shock. Any damage to the isolation or individual components may be life-threatening.

- ↗ Never touch live parts of the sieving station.
- ↗ Have any electrical work which is not described in this operating manual carried out only by a qualified electrician. Unqualified personnel must be forbidden from carrying out work on electrical components!
- ↗ Regularly check the electrical cables for any signs of damage. If there is any damage, switch off the voltage supply immediately and arrange for a repair to be carried out.
- ↗ Before any work is carried out on the electrical equipment, the sieving station must be disconnected from the mains power supply via the main switch. The machine must be secured with a padlock to prevent it being switched on again unintentionally.
- ↗ After work has been done on the electrical equipment, all safety-relevant circuits and assemblies must be checked to ensure that they work properly. Any loose connections must be tightened again and damaged lines and cables must be replaced.

⚠ DANGER

Danger posed by stored charges!

Electronic components may have stored electric charges which are retained even after the component has been switched off and disconnected from the power supply.

After all main switches have been switched off, life-threatening voltages may still exist on the following components:

- – Mains cables
- ↗ Before working on the specified components, in particular the mains cables, disconnect them completely from the power supply. Allow 10 minutes to pass in order to ensure that the internal capacitors fully discharge.

2.3.2. Dangers posed by explosion and fire

⚠ DANGER

Danger of explosion from reactive metal-air mixtures!

Swirling up of the approved light-metal alloys in the tumbler sieving station as well as their process-related filter residues in an atmosphere containing oxygen may produce an explosive atmosphere.

- ↗ Mark the danger area around the machine as a potentially explosive area (EX area).
- ↗ Avoid the use of any effective ignition sources within the potentially explosive area.
- ↗ There is a complete ban on smoking in the EX area.
- ↗ Wear antistatic protective equipment in order to prevent electrostatic discharge!
- ↗ Avoid swirling up metal powder or metal dust, welding fume deposits, and filter residues.
- ↗ Never suck up metal powder, welding fume deposits, or filter residues using a standard commercial vacuum cleaner or industrial vacuum cleaner.
- ↗ Wipe off metal powder, welding fume deposits, or filter residues using a suitable cloth.
- ↗ Carry out all powder movements only with the machine components earthed throughout and in an argon atmosphere.

⚠ DANGER

Danger of fire from highly flammable substances!

Metal powders, welding fume deposits, and filter residues can catch fire and cause serious to fatal injuries.

- ↗ Do not smoke within the danger area and the immediate surroundings. Do not produce any naked flames or ignition sources.
- ↗ Wear antistatic protective equipment in order to prevent electrostatic discharge!
- ↗ A suitable fire extinguisher must be placed in the area of the sieving station.
- ↗ Have a suitable fire extinguisher on hand. To extinguish a fire, only use metal fire-extinguishing powder fire class D.
- ↗ Never attempt to put out the fire using water!
- ↗ In the event of a fire, stop work immediately. Vacate the danger area until the all-clear is given.

2.3.3. Dangers posed by mechanisms

WARNING

Danger of injury from the pivoting movement of the sieve!

For users and other people present, there is the danger of being hit by the moving sieve shots as a result of the greater displacement (oscillation) when the drive of the tumbler sieving machine starts up and comes to a stop.

↗ Keep a safe distance away while the sieving station is in operation.

WARNING

Warning about the loss of stability of the sieving station!

The oscillations of the tumbler sieving unit which occur during operation may cause the machine frame to move.

↗ Bolt or anchor all of the frame feet to the floor at the installation site.

2.3.4. Dangers posed by harmful, chemical substances

Before working with metal powders, the document "Safe handling of reactive materials in the LaserCUSING® process", which also applies together with this operating manual, must be followed.

For details about safety measures, the recommended safety equipment and about first-aid measures, please consult the safety data sheets for the individual metal powders!

WARNING

Danger of damage to health when handling metal powders and filter dusts!

When handling metal powders and filter dusts, there is the danger of damage to the respiratory tract and lungs.

If the metal powder or its dusts get into the eyes, there is the danger of damage to the eyes.

Metal powders and filter dusts are suspected of having a carcinogenic effect.

↗ You should wear a suitable respiratory mask when handling metal powders and filter dusts. We recommend a respiratory mask with a P2D or P3D particle filter.

↗ Wear suitable, close-fitting safety goggles.

↗ Particular care must be taken when working with the powder and when emptying the collecting container. Swirling up of powder should be avoided.

↗ Follow the relevant safety data sheets for the individual metal powders which are attached to this operating manual. The specifications contained in them must be complied with at all times.

↗ The recommended safety equipment must always be worn!

⚠ CAUTION

Danger of damage to the skin from contact with metal powders!

The metal powders CL 20ES, CL 50WS, CL 60DG, and CL 90RW contain the element nickel. Nickel is a toxic element which causes irreversible damage to the skin. Nickel is suspected of being allergenic and carcinogenic.

↗ You should wear suitable protective gloves when handling these metal powders and their filter dusts.

↗ Particular care must be taken when working with the powder and when emptying the collecting container. Swirling up of powder should be avoided.

↗ Follow the relevant safety data sheets for the individual metal powders which are attached to this operating manual.

↗ The recommended safety equipment must always be worn!

Notes on storing reactive metal powders

– The powder may only be stored in the vessels in which it is delivered or in the master and standard powder containers from Concept Laser.

– The powder is to be stored under an inert atmosphere. Make sure that the correct inert gas is chosen:

  ▪ For titanium powder, only argon may be used as the inert gas.

– Never store metal powders in the sieving station over a prolonged period of time.

– A fairly large powder stockpile must be stored in a fire-resistant cabinet in a well-ventilated place.

➲ Do not open the powder bottles or the powder container in an atmosphere containing oxygen, e.g. in the ambient air.

➲ Only open the powder bottles or the powder container immediately before starting the sieving process, with sufficient inertization (oxygen limit concentration 2%).

NOTICE

Storage of the powder outside of the building is ideal.

2.3.5. Dangers posed by inert gas supply

DANGER

Danger of suffocation from toxic gases or inert gas!

Escaping inert gas, such as the colorless and odorless protective gas argon, can cause a lack of oxygen.

- ↗ Do not damage or disassemble inert gas lines.
- ↗ Always check the inert gas connections to make sure they are solid and tight.
- ↗ Check the inert gas supply and connections for any leaks.
- ↗ Always make sure there is sufficient ventilation when working on the machine.
- ↗ If a gas leak is discovered, the room must be vacated immediately and you may only re-enter it wearing suitable breathing equipment.
- ↗ It is imperative that you follow the safety data sheets for the inert gases used, as well as the operator's operating instructions.

WARNING

Danger from using the wrong inert gas!

If a wrong inert gas is used, this can produce exothermic reactions (fire, explosion) from the metal powder.

- ↗ Use only argon as the inert gas.

2.4. Duties of care of the operator

Definition of operator

The operator is the person who operates the machine himself for commercial or economic purposes or hands it over to a third party for use / application and during operation bears legal product responsibility for the protection of the user, the personnel, or third parties.

Operator's duties

The sieving station is state of the art and guarantees a high level of safety. However, when operating the station in practice, this safety can only be achieved if all of the necessary measures are taken.

It is the operator's duty of care to plan these measures and to check that they are carried out (see the Ordinance on Industrial Health and Safety).

The operator must ensure in particular that:

- the sieving station and its components are only used in the designated way (see Section *2.1 Designated use*).
- The sieving station and its components may only be operated when they are in perfect working order. If any damage or destruction is found on the sieving station and/or its components, the machine must be taken out of operation immediately and Concept Laser GmbH's customer service team must be notified. (See Chapter *10 Support and customer* service)
- If any faults or defects are found on the sieving station during operation, the machine must be taken out of operation immediately and Concept Laser GmbH's customer service team must be notified. (See Chapter *10 Support and customer* service)
- the operating manual is always available in a legible format and in full to the operating personnel at the place where the sieving station is used.
- only suitably qualified and authorized personnel operate and maintain the sieving station.
- these personnel regularly receive instruction on all the relevant matters of occupational safety and environmental protection, and also that they are aware of and follow this operating manual and in particular the safety notices which it contains.
- all safety notices and warning signs which are attached are not removed and remain legible.

The sieving station must not be operated under any circumstances:

- when maintenance work is being carried out on the machine or on its components.
- when the machine or one of its components is damaged or there is a suspicion that damage may occur during operation.

2.5. Qualification of the personnel

The different tasks described in this manual present different requirements in relation to the level of qualification of the people who are entrusted with these tasks.

⚠ WARNING

Danger if the personnel are insufficiently qualified!

Insufficiently qualified people are not able to assess the risks when working with the machine and place themselves and others at risk of serious or fatal injuries.

↗ Make sure that all work is only carried out by people who are qualified to do it.

↗ Keep insufficiently qualified people away from the working area.

All work may only ever be carried out by people who can be expected to execute this work reliably. People whose ability to react is influenced, e.g. by drugs, alcohol, or medicines, are not allowed to carry out any work.

User

The operating personnel must be at least 18 years of age and have a good knowledge of the operating language of English.

Only people who have read and understood this manual may carry out work on the machine. The operator is urged to get users to confirm in writing that they are aware of the content of this operating manual.

The user has received instruction in an instruction briefing by the operator on use, the safety devices, and the possible hazards in the event of incorrect behavior. The user may only carry out tasks which go beyond normal operational use if this is specified in the manual and the operator has explicitly given the user this task. The operator is urged to get users to confirm in writing that they have received the instruction briefing.

Manufacturer

Certain pieces of work may only be carried out by specialist personnel from the manufacturer. Other personnel are not authorized to carry out this work. To arrange for the required work to be carried out, contact our customer service department. (See Chapter *10 Support and customer service*)

2.6. Personal protective equipment

Personal protective equipment is designed to protect people from any negative impacts on health and safety when working.

When does the personal protective equipment have to be worn?

Wear your personal protective equipment whenever you come into contact with metal powder, welding fume deposits and filter residues or their dusts.

The wearing of personal protective equipment is highlighted once again separately in the individual sections in this manual.

Description of the personal protective equipment

Protective work clothing

Protective work clothing is close-fitting work clothing with low tear strength, with tight sleeves, and without any protruding parts.

Chemical-resistant protective gloves

Chemical-resistant protective gloves are used to protect the hands from aggressive chemicals.

Protective goggles (tight-fitting)

The protective goggles are used to protect the eyes from any parts flying around and any liquid splashing.

Protective gloves

Protective gloves are used to protect the hands from any abrasion, grazes, pricks, or deeper injuries and from touching hot surfaces.

Respirator mask (FF P2D or FF P3D)

The particle-filtering half-mask (filtering facepiece particle) prevents the user breathing in harmful dusts, mists, and fumes.

Antistatic protective equipment (ESD kit)

The protective equipment consists of an ESD armband and a grounding cable with a push-button.

2.7. Safety and emergency stop devices

⚠ DANGER

Danger to life if safety devices are not working properly!

If safety devices are not working properly or have been rendered inoperative, there is the risk of serious injuries or even death.

- ↗ Before starting work, check whether all safety devices are in good working order and have been installed correctly.
- ↗ Never override or bypass safety devices.
- ↗ Ensure that all safety devices are accessible at all times.

2.7.1. EMERGENCY STOP switch

In the event of any danger to people or the risk of damage to the machine, the EMERGENCY STOP switch must be pressed immediately.

When the emergency stop switch is pressed, the sieving station comes to a safe standstill.

In a safe standstill:

- all drives are shut down,
- the sieving process is interrupted,
- the inert gas supply is interrupted and
- all pending control commands are reset.

⚠ DANGER

Danger to life from uncontrolled restart!

An uncontrolled restart of the sieving station may result in serious injuries or even death.

- ↗ Make sure before restarting the sieving station that the cause of the emergency stop has been rectified and that all safety devices are in place and in good working order.
- ↗ Only unlock the emergency stop switch when there is no longer any danger.

NOTICE

The electrical connections are NOT disconnected from the mains.

The machine control system remains active.

The EMERGENCY STOP switches should only be used in a dangerous situation. To perform a normal switch-off of the automatic sieving station, please follow the instructions on how to handle it in Chapter *5.6 Ending the* sieving process.

Location of the EMERGENCY STOP switches

The automatic sieving station is equipped with two EMERGENCY STOP switches.

EMERGENCY STOP switch

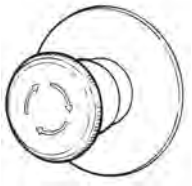


Figure 1: Location of the EMERGENCY STOP switches

1 EMERGENCY STOP switch on the control panel

2 EMERGENCY STOP switch on the sieving station

2.7.2. Main switch

DANGER

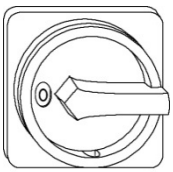
Danger to life from uncontrolled restart!

An uncontrolled restart of the machine may result in serious injuries or even death.

- ↗ Make sure before restarting the machine that the cause of the emergency stop has been rectified and that all safety devices are in place and in good working order.
- ↗ Only turn the main switch back to the "I" position when there is no longer any danger and all maintenance or repair measures have been completed.

For all maintenance and repair measures, the main switch of the automatic sieving station must be switched off.
The main switch is at the same time also designed as an emergency stop switch. By turning the main switch to the "0" position, the machine is shut down by immediately switching off the power supply and an emergency stop is thus triggered.

Main switch



Location of the main switches

Figure 2: Location of the EMERGENCY STOP switches

1 Main switch on the side of the machine

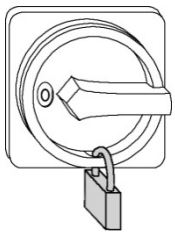
NOTICE

Only when all main switches have been switched off may maintenance or repair work be performed on the automatic sieving station.

2.7.3. Securing against reactivation

	**⚠ DANGER** **Danger to life from uncontrolled restart!** An uncontrolled restart of the machine may result in serious injuries or even death. ↗ Make sure before restarting the machine that the cause of the emergency stop has been rectified and that all safety devices are in place and in good working order. ↗ Only turn the main switch back to the "I" position when there is no longer any danger and all maintenance or repair measures have been completed.

Main switch



1. Switch off power supply. To do this, turn the main switch to the "0" position.
2. Secure the main switch with a padlock.
3. Remove the key.
4. Give the key for the padlock to a responsible employee for safekeeping.

2.8. Safety notices on the device

The following symbols and notices can be found on the sieving station.

WARNING

Danger posed by illegible safety notices!

Over the course of time, stickers and signs may get dirty or become indecipherable in some other way so that dangers cannot be identified and necessary operating instructions cannot be followed. This leads to a risk of injury.

- ↗ Maintain all safety notices, warnings, and operating instructions so that they are easy to read at all times.
- ↗ Replace any damaged signs or stickers immediately.

Warning signs

Warning about electrical voltage

The working area which is marked with this sign may only be opened if the machine has been disconnected from the mains power supply. Disconnect the machine from the mains power supply via the main switch and by pulling out the mains plug.

Unauthorized persons may not open the marked areas.

Warning about using the wrong inert gas

The sieving station may only be inertized with argon. The use of another inert gas is prohibited.

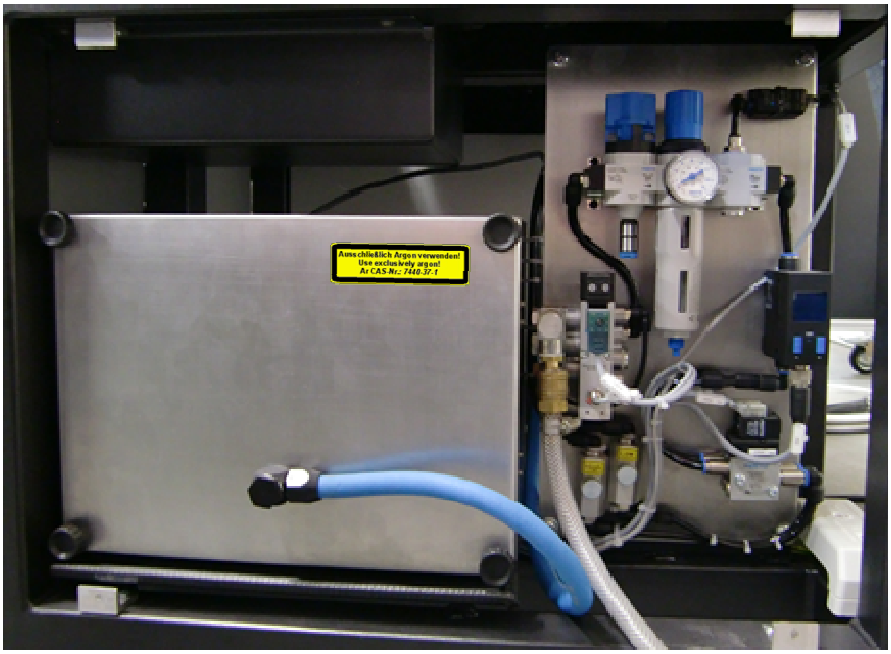


Figure 3: Safety notice on the sieving station

3. Technical data

Weight of sieving station	approx. 350 kg
Dimensions of sieving station (W x D x H)	1039mm x 1013mm x 1583mm
Supply voltage	3 P/N/PE AC 400V, ±10%, 50Hz-60Hz
Machine connection	1x CEE plug, 400V 16A 6h, 4m cable
To be provided by the customer	1x CEE socket, 400V 16A 6h
Power consumption	0.5 kW
Control voltage	24 V DC
Inert gas (protective gas)	Argon, 5 bar, max. 20 l/min
Storage and transport temperature	-20 – +35°C
Function at ambient temperature	+15 – +35°C
Dynamic weight	approx. 360 kg when switched on approx. 140 kg during continuous operation
Condition of base	Vibration-free foundation
Relative humidity	Max. 80 % (non-condensing) (use exclusively indoors)
Sound pressure level (at distance of 1 m)	≤ 84 dB (A)
CE marking	CE

3.1. Requirement placed on the installation site

Environmental influences such as voltage fluctuations, temperatures, or atmospheric moisture levels which are too high or too low may not have any influence on the sieving station, but they can result in malfunctions.
The correct and proper installation of the sieving station is a prerequisite.

NOTICE
The machine must be situated on a vibration-free foundation. The machine should be securely anchored to the floor of the hall.

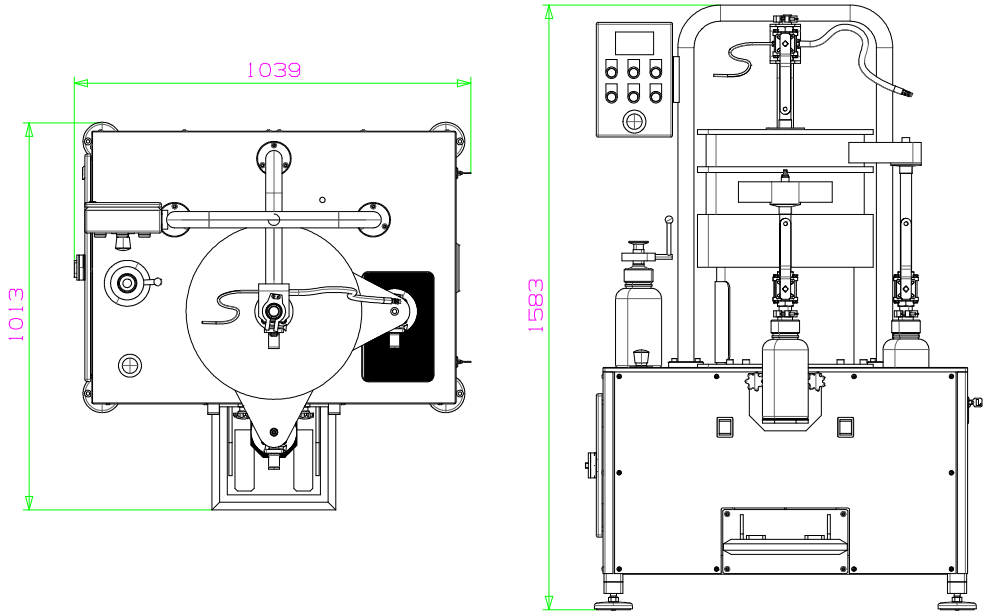


Figure 4: Dimensions of sieving station

3.2. Type plate

Figure 5: Type plate for sieving station

The type plate contains the following details

- Manufacturer and manufacturer's address
- Type / version
- Year of construction
- Supply voltage
- Inert gas pressure

4. Structure and function

The powder container which is filled with the metal powder to be sieved is connected to the powder inlet (9). The powder drops onto the sieve in the sieving kit (11). The vibration produced by the vibration motor (3) (imbalance approx. 67%) causes the oversized grain to be moved into the outlet (12), while the sieved material passes through the sieve and reaches the outlet (14). The sieved powder then drops either into the powder container (15) or into a powder bottle flanged onto the outlet.

The sieving station is inertized via the black hose at the top on the outlet for the good powder. The inert gas flows through the sieve and escapes via the blue hose on the top of the oversized grain outlet out to the filter housing.

The components of the sieving station are shown below.

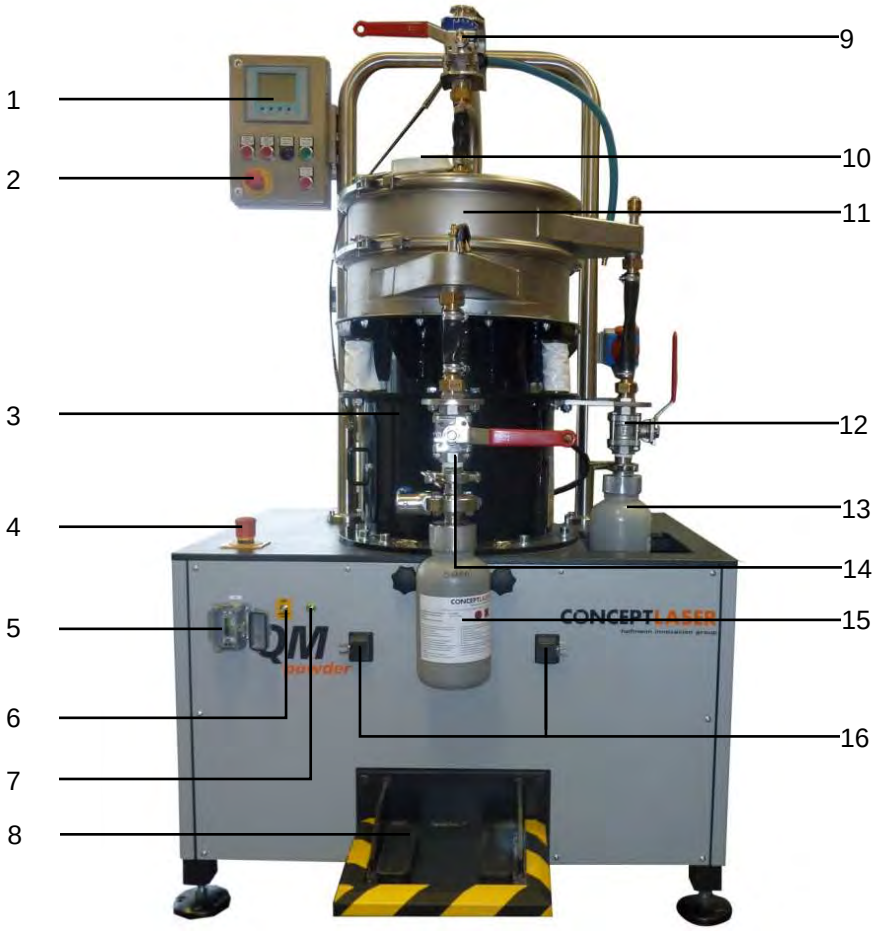


Figure 6: Components of the sieving station - side view

1 Control panel
2 Emergency stop switch on the control panel
3 Vibration motor
4 Emergency stop switch on the machine
5 Connection for grounding the lifting device
6 Connection for ESD armband
7 Connection for grounding for wet separator
8 Receptacle for powder container
9 Powder inlet
10 Pressure relief valve of the sieving station
11 Sieving kit
12 Outlet for oversized grain
13 Powder bottle for oversized grain
14 Outlet for sieved material
15 Powder bottle for sieved material
16 Safeguard for powder container

Behind the filter housing cover (19) there is an H14 filter which has a residual O_2 sensor and a pressure relief valve connected downstream of it. This is where the excess pressure produced by the inertization is released. If this cannot be done quickly enough (if the flow rates are too high), the excess pressure escapes at the outlet at the top of the sieving station (10). The flow rates (15 - 20 l/min preflushing, approx. 1.5 l/min continuous flooding) are set on the control elements (22).
The sieving unit can be grounded via an additional grounding busbar (21).

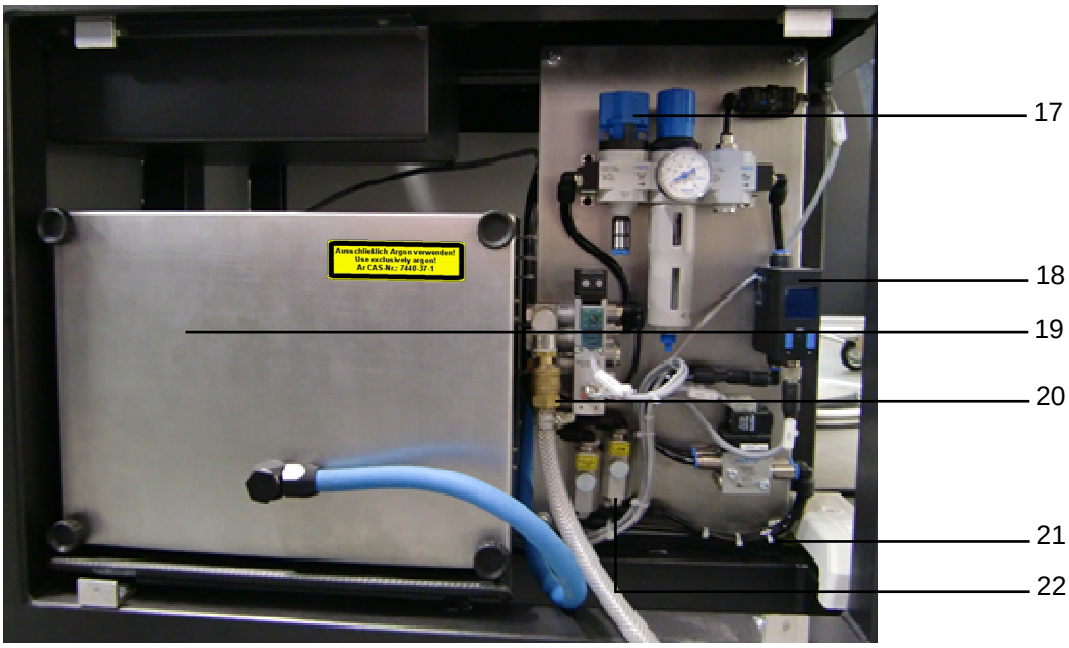


Figure 7: Components of the sieving station - side view (inside)

17 Inert gas maintenance unit
18 Flow meter
19 Filter housing with H14 filter
20 Connection for argon
21 Grounding connection
22 Flow rate adjustment

5. Operation

DANGER

Danger of injury from improper use!

Improper use can lead to serious injuries and considerable material damage.

- ↗ Carry out all operating steps in accordance with the specifications and instructions in this manual.
- ↗ Never override or bypass safety devices during operation.
- ↗ Before doing any work on the machine, read through Chapter 2 *General safety* notices.

DANGER

Danger posed by dangerous electrical voltage!

If you touch live parts, there is an immediate danger to life posed by electric shock. Any damage to the isolation or individual components may be life-threatening.

- ↗ Never touch live parts of the machine.
- ↗ Regularly check the electrical cables for any signs of damage. If there is any damage, switch off the voltage supply immediately and arrange for a repair to be carried out.
- ↗ Earth the lifting device before removing a powder container from the LaserCUSING® machine or the sieving station.

Wear protective equipment!

During all work on and in the LaserCUSING® machine in which you come into contact directly with metal powders, welding fume deposits, filter residues, and their dusts, the prescribed protective equipment must be worn.

5.1. Before switch-on

In order to ensure safe operation, it is necessary to carry out a number of checks before switching on the sieving station.
The following checks should be carried out before switching on the machine:

1. Check the inert gas supply.
   - ➲ Check that argon is connected as the inert gas.
   - ➲ Check the inert gas line for any damage or leaks.
   - ➲ Check whether a sufficient quantity of inert gases is available.
2. Check all plug connections on the sieving station.
   - ➲ Check all electrical lines and grounding cables for any signs of damage.
   - ➲ Check that all plug connections are correctly and firmly in place.
3. Check your personal protective equipment (tight-fitting protective goggles, dirt-resistant and close-fitting clothing, a respiratory mask and ESD kit) to ensure that it is not damaged and is in good working order.
   Lay out your protective equipment so that it is ready to be used.

5.2. Preparing the sieving process

The metal powder can be provided for the sieving process via two alternative methods.

– Provision in a powder bottle (for fairly small quantities of metal powder)
– Provision in a powder container (for fairly large quantities of metal powder and reactive metal powders)

Both methods are described in this subchapter.

5.2.1. Provision in powder containers.

Make sure that there is a sufficient amount of space in the collecting container to accommodate all of the sieved material. The general rule is that, if the material for sieving is provided in a powder container, the collecting container should also be a powder container.

WARNING

Warning about dangers posed by the use of a lifting device!

The inappropriate use of a lifting device may present numerous hazards to the user.

↗ Note and follow the operating manual for the lifting device, in particular the notes on safety.
↗ Use the correct jacking points for the powder device in order to prevent it from falling off.
↗ Never place yourself beneath raised loads.

CAUTION

Warning about physical injury from carrying heavy loads!

The powder containers are very heavy.

↗ Only move the containers using suitable equipment aids (lifting device).
↗ Never attempt to carry the containers yourself.

1. Ground the lifting device.
   ➲ Connect the plug on the grounding cable of the lifting device to the socket on the sieving station.

NOTICE
Make sure that in the container or bottle there is no powder or only powder of the same type as the powder which is to be sieved.

2. Position the collecting container at the powder outlet.
   - ➲ Use the lifting device to move an empty powder container up to the sieving station.
   - ➲ Place the powder container on the receptacle for powder containers.
   - ➲ Lock the powder container onto the sieving station using the clamping fasteners on the powder container.
   - ➲ Only now should you release the powder container from the lifting device.
   - ➲ Slowly move the lifting device away from the sieving station.

- For a more detailed description, please consult the operating manual for the lifting device.

3. Connect the collecting container.
   - ➲ Attach the connecting hose between the powder container and the powder outlet of the sieving station.
   - ➲ Close the clip and tighten the wing nut so that it is tight.

4. Connect the powder bottle to the outlet for oversized grain.
   - ➲ Screw the bottle adapter for the sieving station onto an empty powder bottle.
   - ➲ Place the powder bottle onto the oversized grain outlet.
   - ➲ Close the clip around the outlet and the adapter.
   - ➲ Tighten the wing nut in order to lock the powder bottle.

5. Lift the powder container with the material for sieving over the sieving station.

NOTICE
Check that the lifting device has been earthed correctly.

➲ Move the lifting device with the fork below the mountings on the powder container.

➲ Secure the powder container with the two securing strips (lift up the locking bolts to do this) and then lock the strips with the securing bolt.

- For a more detailed description, please consult the operating manual for the lifting device in the other relevant documents.

➲ Choose the right powder outlet hose for the metal powder which is in the powder container.

➲ Attach the powder outlet hose using the clamp on the powder container.

➲ Use the lifting device to lift the powder container over the sieving station and move it slowly towards the sieving station.

NOTICE
Approach the sieving station slowly with the lifting device. Move under the sieving station with the lifting device. Avoid a collision.

➲ Position the powder container so that the powder outlet hose is above the inlet opening of the sieving station.

➲ Step on the brakes on the castors of the lifting device.

⇨ The lifting device is now secured against being moved accidentally.

6. Connect the powder container with the material for sieving to the sieving station.

➲ Place the sealing ring onto the powder inlet of the sieving station.

➲ Position the powder outlet hose above the powder inlet valve.

➲ Close the clip around the powder outlet hose.

➲ Tighten the wing screw.

5.2.2. Provision in powder bottles

Make sure that there is a sufficient amount of space in the collecting container to accommodate all of the sieved material. The powder bottle at the powder outlet should have at least the volume of the powder bottle at the powder inlet.

1. Connect the collecting container.
   - ➲ Screw the bottle adapter for the powder outlet (adapter with butterfly valve) onto an empty powder bottle.
     The butterfly valve must be closed.
   - ➲ Place the powder bottle onto the powder outlet of the sieving station.
   - ➲ Close the clip around the outlet and the adapter.
   - ➲ Tighten the wing nut in order to lock the powder bottle.

2. Connect the powder bottle to the outlet for oversized grain.
   - ➲ Screw the bottle adapter for the sieving station onto an empty powder bottle.
   - ➲ Place the powder bottle onto the oversized grain outlet.
   - ➲ Close the clip around the outlet and the adapter.
   - ➲ Tighten the wing nut in order to lock the powder bottle.

3. Connect the powder bottle with the material for sieving to the sieving station.
   - ➲ Open the powder bottle and swiftly screw on the bottle adapter for the powder inlet (adapter with butterfly valve).
     The butterfly valve must be closed.
   - ➲ Place the sealing ring onto the powder inlet of the sieving station.
   - ➲ Place the powder bottle onto the powder inlet of the sieving station.
   - ➲ Close the clip around the outlet and the adapter.
   - ➲ Tighten the wing nut in order to lock the powder bottle.

5.3. Preparing the sieving station

WARNING

Danger from using the wrong inert gas!

If a wrong inert gas is used, this can produce exothermic reactions (fire, explosion) from the metal powder.

↗ Use only argon as the inert gas.

1. Open valves for the inert gas supply to the sieving station.
2. Switch on the sieving station.
   - ➲ Turn the main switch on the left-hand side of the sieving station to the "I" position.
   - ⇨ A loud beep indicates that the switch-on process is taking place.
   - ⇨ The "Emergency Stop Reset" switch on the control panel of the machine lights up.

3. Enable the machine controller.
   - ➲ Make sure that no emergency stop switch has been pressed and that no hazard situation exists.
   - ➲ Press the flashing "Emergency Stop Reset" switch on the control panel of the machine.
   - ⇨ The display shows the current oxygen content in the sieving station, as well as the preset sieving time.

4. Prepare inertization.

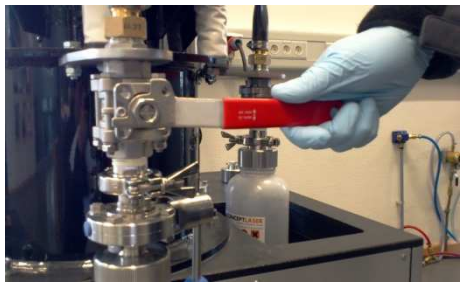
DANGER

Danger of fire and explosion from metal powders!

Metal powders can catch fire and cause serious to fatal injuries.

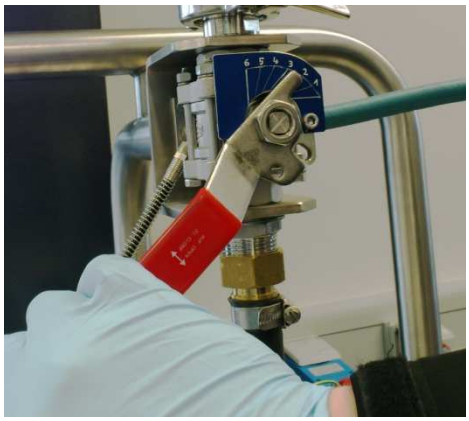
↗ Never open the butterfly valve on the powder container with material for sieving or on the powder bottle with material for sieving before inertization has been completed.

- ➲ Open the ball valve to the collecting container or the powder bottle on the powder outlet of the sieving station.
- ➲ Open the butterfly valve to the collecting container or the powder bottle on the powder outlet.



- ➲ Open the ball valve on the oversized grain outlet.

➲ Open the ball valve on the powder inlet.



5.4. Inertizing the sieving station

⚠ DANGER

Danger of explosion from reactive metal-air mixtures!

Swirling up of the approved light-metal alloys as well as their process-related welding fumes in an atmosphere containing oxygen may produce an explosive atmosphere.

- ↗ Never open the butterfly valve on the powder inlet of the sieving station without sufficient inertization.
- ↗ Use only argon as the inert gas.
- ↗ Never start the sieving process without sufficient inertization.
- ↗ Mark the danger area around the machine as a potentially explosive area (EX area).
- ↗ Avoid the use of any effective ignition sources within the potentially explosive area.
- ↗ Wear antistatic protective equipment in order to prevent electrostatic discharge!
- ↗ Avoid swirling up metal powder or metal dust, welding fume deposits and filter residues.

⚠ DANGER

Danger of fire from highly flammable substances!

Metal powders and welding fumes can catch fire and cause serious to fatal injuries.

- ↗ Never open the butterfly valve on the powder inlet of the sieving station without sufficient inertization.
- ↗ Use only argon as the inert gas.
- ↗ Never start the sieving process without sufficient inertization.
- ↗ Wear antistatic protective equipment in order to prevent electrostatic discharge!
- ↗ A suitable fire extinguisher must be placed in the area of the sieving station.
- ↗ Have a suitable fire extinguisher on hand. To extinguish a fire, only use metal fire-extinguishing powder fire class D.
- ↗ Never attempt to put out the fire using water!
- ↗ In the event of a fire, stop work immediately. Vacate the danger area until the all-clear is given.

NOTICE

Flushing must always take place for at least 60 sec. because the oxygen sensor is situated behind the filter at the gas outlet. This time is required to ensure a complete circulation of the gas volume in the sieving station so that the sensor on the gas outlet measures the O_2 concentration in the station.

1. Initiate inertization.
   ➲ Press the "Sieving Start" button on the control panel of the machine.

   ⇨ The preflushing is activated. The valve with the "large" volume flow is opened (volume flow 15-20 l/min).

   - The minimum and maximum preflushing times can be varied (see the "Settings of the sieving station" chapter).

NOTICE

A maximum oxygen limit value of 1.0% is recommended.

The limit value can be set in the CONCEPT Laser software.

If the value falls below the oxygen limit value which is set, flooding continues for at least another 60 sec.

   - After this, the flow of inert gas is reduced, the "large" valve is closed and the "small" valve is opened (volume flow approx. 1.5 l/min.) in order to maintain the inertization.

   ⇨ 3 short beeps indicate that successful inertization of the sieving station has taken place.

NOTICE

If the specified residual O_2 value is not achieved in the max. specified time, the machine should be checked to verify whether it is leaktight.

   - If the oxygen concentration again rises above the upper threshold, the large valve is automatically opened for at least 60 sec.

5.5. Starting the sieving process

1. Initiate inertization.
   ➲ Press the "Sieving Start" button on the control panel of the machine.

2. Open the butterfly valve on the powder container with material for sieving or on the powder bottle with material for sieving.
   ⇨ The sieving process begins with the preset sieving time.

5.6. Ending the sieving process

Once all of the powder has passed through the sieve, the sieving process can also be ended manually by pressing the "Sieving Stop" button before the preset sieving time has elapsed.

NOTICE

All of the powder has passed through the sieve when no more oversized grain drops into the bottle for the oversized grain or no more powder drops into the collecting container or the collecting bottle at the bottom.

1. End the sieving process manually and stop the inertization.
   - ➲ Press the "Sieving Stop" button on the control panel of the machine.
   - ⇨ The sieving process is ended manually.
   - ⇨ The inert gas supply is interrupted.
   - ➲ Wait for the sieving machine to come to a stop.

NOTICE

The inertization continues to run until the "Sieving Stop" button is pressed or the main switch is turned to the "0" position.

If the sieving time elapses, the inertization continues to be maintained.

2. Close the butterfly valve on the collecting container or the powder bottle on the powder outlet.
   - ▪ To achieve sufficient inertization in the powder container or the powder bottle at the powder outlet, the butterfly valve must be closed as soon as the stop button is pressed.

3. Turn the main switch on the left-hand side of the sieving station to the "0" position.

⚠ DANGER

Warning about physical injury from the use of metal powders!

The use of metal powders presents various hazards, in particular the risk of fire and explosion.

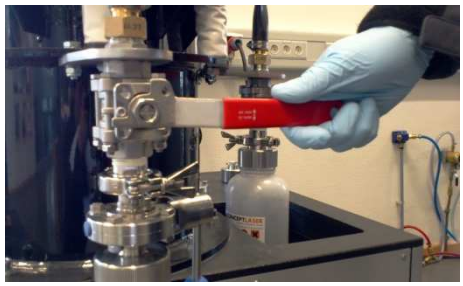
↗ After each sieving process, wait for a period of at least 10 minutes before you carry out any further operations on the sieving station. This time is required to allow the metal powder dust to settle in the station and the powder containers.

4. Wait for a period of 10 minutes.
   ⇨ The powder dust in the sieving station and the powder containers or powder bottles settles.

5. Close the butterfly valve on the powder container or the powder bottle at the powder inlet of the sieving station.
   ➲ Turn the valve lever into its horizontal position.

6. Close the ball valve on the powder inlet of the sieving station.
   ➲ Turn the valve lever into its horizontal position.

7. Close the ball valve on the powder outlet of the sieving station.
   ➲ Turn the valve lever into its horizontal position.



8. Close the ball valve at the oversized grain outlet of the sieving station.
   ➲ Turn the valve lever into its horizontal position.

9. Disconnect the powder containers or powder bottles from the powder inlet and powder outlet of the sieving station.
   - Depending on how the metal powder was provided for the sieving process, in powder containers or powder bottles, follow the instructions on how to handle them in the following subchapters.

10. Exhaust the powder inlet and powder outlet of the sieving station.
    - Use a suitable vacuum cleaner with a wet separator.
    - ➲ Suck up all visible powder residues from the sieving station.

11. Exhaust the powder containers which are used and remove all powder residues from the powder containers.
    - Use a suitable vacuum cleaner with a wet separator.

5.6.1. Provision in powder containers

If the material for sieving was provided in powder containers, please follow the handling instructions specified under this chapter to complete the sieving process.

WARNING

Warning about dangers posed by the use of a lifting device!

The inappropriate use of a lifting device may present numerous hazards to the user.

- ↗ Note and follow the operating manual for the lifting device, in particular the notes on safety.
- ↗ Use the correct jacking points for the powder device in order to prevent it from falling off.
- ↗ Never place yourself beneath raised loads.

CAUTION

Warning about physical injury from carrying heavy loads!

The powder containers are very heavy.

- ↗ Only move the containers using suitable equipment aids (lifting device).
- ↗ Never attempt to carry the containers yourself.

NOTICE

Check that the lifting device has been earthed correctly.

1. Disconnect the powder container from the powder inlet of the sieving station.
   - ➲ Undo the wing screw.
   - ➲ Open the clip around the powder outlet hose.
   - ➲ Move the powder container up slightly using the lifting device.
   - ➲ Remove the sealing ring from the powder inlet of the sieving station.

2. Lower the empty powder container and remove it from the sieving station.
   - ➲ Move the lifting device with the raised powder container slowly away from the sieving station.
   - ➲ Lower the powder container to roughly chest height as soon as it is sufficiently far away from the sieving station.

3. Disconnect the powder outlet hose from the powder container
   - ➲ Open the wing screw and the clip around the powder outlet hose.
   - ➲ Place the powder outlet hose in an antistatic bag and store this away in a fire-resistant cabinet.

   - ➲ Now lower the powder container until it is just above the floor.

- For a more detailed description, please consult the operating manual for the lifting device in the other relevant documents.

   - ➲ The powder container can now either be inserted into the LaserCUSING® machine and be connected to the powder overflow (see Chapter 5.8 Inserting the powder container into the machine) or else be cleaned and put into storage (see the "Safe handling of reactive materials in the LaserCUSING® process" operating manual).

NOTICE
Make sure that the butterfly valve on the powder container is closed. The valve lever is in its horizontal position.

4. Disconnect the collecting container from the powder outlet of the sieving station.
   - ➲ Undo the wing screw.
   - ➲ Open the clip around the connecting hose.

5. Remove the collecting container from the receptacle.
   - ➲ Approach the sieving station with the earthed lifting device.
   - ➲ Move the lifting device with the fork below the mountings on the powder container.
   - ➲ Secure the powder container with the two securing strips (lift up the locking bolts to do this) and then lock the strips with the securing bolt.
   - ➲ For a more detailed description, please consult the operating manual for the lifting device in the other relevant documents.
   - ➲ Release the clamping fasteners on the powder container from the sieving station.

- ➲ Move the powder container up slightly using the lifting device.
- ➲ Move the lifting device with the powder container slowly away from the sieving station.
- ➲ Now lower the powder container until it is just above the floor.
  - For a more detailed description, please consult the operating manual for the lifting device in the other relevant documents.
- ➲ The powder container can now either be inserted for filling the LaserCUSING® machine (see the M2 cusing operating manual) or else be put into storage (see the "Safe handling of reactive materials in the LaserCUSING® process" operating manual).

⚠ DANGER

Warning about physical injury from the use of metal powders!

The use of metal powders presents various hazards, in particular the risk of fire and explosion.

↗ Only remove the grounding cable from the lifting device once you have removed the powder container from the sieving station and there is no longer any contact between the sieving station and the powder container.

6. Remove the grounding cable from the lifting device.
   - ➲ Remove the plug on the grounding cable of the lifting device from the socket on the sieving station.
7. Remove the powder bottle at the outlet for oversized grain.
   - The powder bottle at the oversized grain outlet only needs to be removed when there is a change of powder or when it is almost full.
   - ➲ Please follow the instructions provided under Chapter *6.3.1 Removing oversized* grain.
8. Exhaust the powder inlet and powder outlet of the sieving station.
   - Use a suitable vacuum cleaner with a wet separator.
9. Suck up all visible powder residues from the sieving station.
10. Exhaust the powder containers which are used and remove all powder residues from the powder containers.

5.6.2. Provision in powder bottles

If the material for sieving was provided in powder bottles, please follow the handling instructions specified under this chapter to complete the sieving process.

NOTICE
Make sure that the butterfly valve on the bottle adapter is closed. The valve lever is in its horizontal position.

1. Remove the powder bottle at the powder outlet.

	**⚠ CAUTION** **Warning about metal powder from dropping the powder bottle!** Avoid dropping the powder bottle containing metal powder. ↗ Hold the bottle in its position when you release the clip at the powder outlet and powder inlet.

- ➲ Undo the wing screw.
- ➲ Open the clip around the bottle adapter.
  Be sure to hold the powder bottle securely when you open the clip. The powder bottle is held in place exclusively by the clip.
- ➲ Remove the powder bottle slowly and upright.

2. Remove the powder bottle at the powder inlet.
   - ➲ Undo the wing screw.
   - ➲ Open the clip around the bottle adapter.
     Be sure to hold the powder bottle securely when you open the clip.
   - ➲ Remove the powder bottle slowly.
   - ➲ Remove the bottle adapter and close the powder bottle swiftly with the bottle lid.

3. Remove the powder bottle at the outlet for oversized grain.
   - ▪ The powder bottle at the oversized grain outlet only needs to be removed when there is a change of powder or when it is almost full.
   - ➲ Please follow the instructions provided under Chapter *6.3.1 Removing oversized* grain.
4. Exhaust the powder inlet and powder outlet of the sieving station.
   - ▪ Use a suitable vacuum cleaner with a wet separator.
5. Suck up all visible powder residues from the sieving station.
6. Exhaust the powder containers which are used and remove all powder residues from the powder containers and bottle adapters.

6. Cleaning of the sieving station

6.1. Safety notices

DANGER

Danger from a lack of potential equalization!

If the potential equalization is not plugged in or the grounding cable is not plugged in, there is no explosion protection.

↗ The machine must not be disconnected from the mains during maintenance work.

DANGER

Danger of explosion from reactive metal-air mixtures!

Swirling up of the approved light-metal alloys as well as their filter residues in an atmosphere containing oxygen may produce an explosive atmosphere.

↗ Avoid the use of any effective ignition sources within the potentially explosive area.

↗ There is a complete ban on smoking in the EX area.

↗ Avoid swirling up metal powder or metal dust, deposits, and filter residues.

↗ Contaminated surfaces must not be blown off using a compressed air gun.

↗ Only ever suck up metal powder, welding fume deposits, or filter residues using a wet separator.

↗ Wipe off metal powder, welding fume deposits, or filter residues using a suitable slightly damp cloth.

↗ Ensure that the working area is well ventilated.

WARNING

Danger of injury from intentional restart!

If the sieving station is switched on again during the maintenance work, there is a danger of injury.

↗ Switch off all main switches before carrying out any maintenance work within the sieving station.

WARNING

Danger posed by maintenance measures carried out incorrectly!

Incorrect maintenance can lead to serious injuries and considerable material damage.

↗ Make sure you maintain order and cleanliness at the place of installation! Loose components and tools lying around or on top of one another can cause accidents.

↗ When components have been removed, make sure the machine is put back together correctly, fit all securing elements again and ensure the screws are tightened to the correct torques.

↗ All maintenance work may only be carried out in accordance with the information and specifications in this operating manual.

WARNING

Danger of injury from the use of incorrect spare parts and non-approved operating materials!

The use of incorrect or defective spare parts or non-approved operating materials can present dangers to the personnel involved and cause damage, malfunctions, or a total failure.

- ↗ Only use original spare parts from the manufacturer or spare parts which are approved by the manufacturer.
- ↗ Only use operating materials with the same mechanical, physical, chemical, and electrical properties.

NOTICE

The manufacturer's guarantee shall be cancelled if non-approved spare parts and operating materials are used.

6.1.1. Description of the personal protective equipment

Protective work clothing

Protective work clothing is close-fitting work clothing with low tear strength, with tight sleeves, and without any protruding parts.

Chemical-resistant protective gloves

Chemical-resistant protective gloves are used to protect the hands from aggressive chemicals.

Protective goggles (tight-fitting)

The protective goggles are used to protect the eyes from any parts flying around and any liquid splashing.

Protective gloves

Protective gloves are used to protect the hands from any abrasion, grazes, pricks or deeper injuries and from touching hot surfaces.

Respirator mask (FF P2D or FF P3D)

The particle-filtering half-mask (filtering facepiece particle) prevents the user breathing in harmful dusts, mists, and fumes.

Antistatic protective equipment (ESD kit)

The protective equipment consists of an ESD armband and a grounding cable with a push-button.

6.2. Qualification of the personnel

The different tasks described in this manual present different requirements in relation to the level of qualification of the people who are entrusted with these tasks.

⚠ WARNING

Danger if the personnel are insufficiently qualified!

Insufficiently qualified people are not able to assess the risks when working with the machine and place themselves and others at risk of serious injuries.

↗ Make sure that all work is only carried out by people who are qualified to do it.

↗ Keep insufficiently qualified people away from the working area.

All work may only ever be carried out by people who can be expected to execute this work reliably. People whose ability to react is influenced, e.g. by drugs, alcohol, or medicines, are not allowed to carry out any work.

User

The operating personnel must be at least 18 years of age and have a good knowledge of the operating language of English.

Only people who have read and understood this manual may carry out work on the machine. The operator is urged to get users to confirm in writing that they are aware of the content of this operating manual.

The user has received instruction in an instruction briefing by the operator on use, the safety devices, and the possible hazards in the event of incorrect behavior. The user may only carry out tasks which go beyond normal operational use if this is specified in the manual and the operator has explicitly given the user this task. The operator is urged to get users to confirm in writing that they have received the instruction briefing.

Manufacturer

Certain pieces of work may only be carried out by specialist personnel from the manufacturer. Other personnel are not authorized to carry out this work. To arrange for the required work to be carried out, contact our customer service department.

6.3. Cleaning of the sieving station during a powder change

DANGER

Warning about physical injury from the use of metal powders!

The use of metal powders presents various hazards, in particular the risk of fire and explosion.

↗ After the last sieving process, wait for a period of at least 10 minutes before you carry out any further operations on the sieving station. This time is required to allow the metal powder dust to settle in the station and the powder containers.

NOTICE

The sieving station must be cleaned carefully during each change of powder.

If the powder is changed frequently, it is recommended that you use a separate sieving kit for each metal powder that is used.

Requirement

– The sieving process is ended in accordance with Chapter *5.6 Ending the* sieving process.
– The sieving station is switched off.
– The sieving station has effective explosion protection. (It is not disconnected from the mains.)
– No powder containers or bottles are connected to the powder inlet and powder outlet.

Preparation

– Make sure that a suitable vacuum cleaner with wet separator is available and check that it is in good working order.
– Provide sufficient cleaning materials:
  - Cloths
  - Antistatic bags
  - Spray bottle containing water or glass cleaner
– Lay out your protective equipment so that it is ready.
– Check whether the bottle fastener for the oversized grain powder bottle is to hand.

The sieving station needs to be cleaned in particular when there is a change of powder. Wait for a period of 10 minutes between two sieving processes before you start cleaning. This allows the dust to settle in the station.

6.3.1. Removing oversized grain

NOTICE
Make sure that the ball valve at the oversized grain outlet is closed. The valve lever is in its horizontal position.

1. Remove the connecting hose at the oversized grain outlet.
   - ➲ Undo the top and the bottom union nut on the connecting hose.
   - ➲ Remove the connecting hose using an antistatic bag and store it in a fire-resistant cabinet.

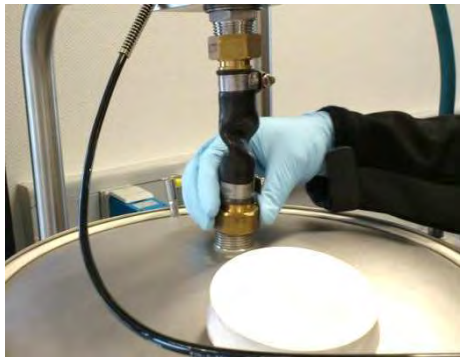
2. Remove the powder bottle containing oversized grain.
   - ➲ Undo the wing screw.
   - ➲ Open the clip around the bottle adapter.
     Be sure to hold the powder bottle securely when you open the clip. The powder bottle is held in place exclusively by the clip.
   - ➲ Remove the powder bottle slowly and upright.
3. Exhaust the adapter on the powder bottle containing oversized grain.
   - ▪ Use a suitable vacuum cleaner with a wet separator.
4. Also exhaust the oversized grain port and the connections for the connecting hose on the sieving station.
   - ➲ Suck up all visible powder residues on the sieving station.
   - ▪ Use a suitable vacuum cleaner with a wet separator.

5. Dispose of the oversized grain in the powder bottle.
   - If there is only a small amount of oversized grain in the bottle: Suck up the oversized grain with a suitable industrial vacuum cleaner with wet separator.
   - If there is a large amount of oversized grain in the bottle: Remove the bottle adapter and close the powder bottle swiftly with the bottle lid.
     Dispose of the oversized grain in accordance with the local, official regulations.

6.3.2. Cleaning the sieving station

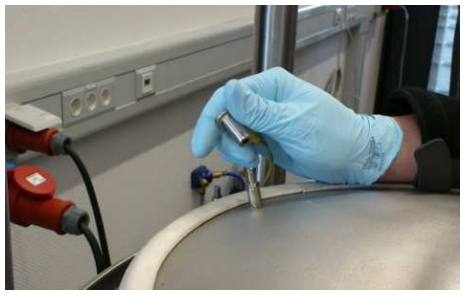
1. Exhaust the valve on the powder inlet.
   - Use a suitable vacuum cleaner with a wet separator.
2. Clean the powder inlet using a brush and a damp cloth.

3. Remove the connecting hose between the powder inlet and the lid of the sieving station.
   - ➲ Undo the top and the bottom union nut on the connecting hose.
   - ➲ Remove the connecting hose using an antistatic bag and store it in a fire-resistant cabinet.



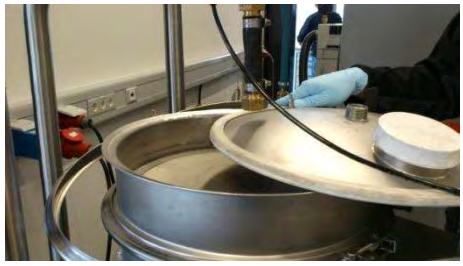
4. Exhaust the powder inlet on the lid of the sieving station.
   - Use a suitable vacuum cleaner with a wet separator.
5. Clean the powder inlet on the lid of the station using a brush and a damp cloth.

6. Remove the grounding cable of the lid on the sieving station.



7. Open the clamping ring.

8. Remove the upper lid of the sieving station.
9. Clean the lid with sufficiently damp cloths.
   - ➲ Clean the inner wall of the lid.
   - ➲ Clean the white seal.
   - ➲ Clean the excess pressure outlet.



10. Remove the upper sieve frame of the sieving station.
    - ➲ Remove the grounding cable for the upper sieve frame.
    - ➲ Open the clamping ring of the upper sieve frame.
    - ➲ Remove the upper sieve frame of the sieving station.

11. Clean the upper sieve frame with a damp cloth.
12. Carefully exhaust the sieve fabric of the sieving kit used.
    - Use a suitable vacuum cleaner with a wet separator.

13. Remove the sieving kit using an antistatic bag.
    - Store the sieving kit in a fire-resistant cabinet.
    - If the sieving kit is to be cleaned for use with another metal powder, follow the instructions in Chapter *6.3.4 Cleaning the* sieving kit

NOTICE

Concept Laser recommends that a separate sieving kit be used for each metal powder that is used. This will prevent potential contamination of the metal powders.

14. Exhaust the lower, fixed sieve frame of the sieving station.
    - Use a suitable vacuum cleaner with a wet separator.

15. Clean the lower, fixed sieve frame with sufficiently damp cloths.
    - ➲ Clean the inside of the sieve frame.
    - ➲ Clean the ball valve.

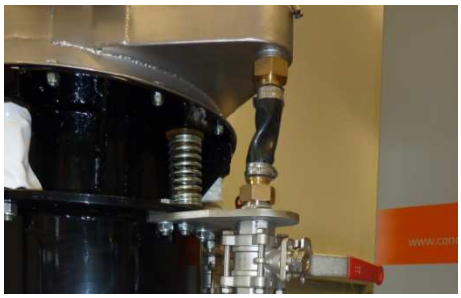
16. Remove the connecting hose at the outlet of the sieving station.
    - ➲ Undo the top and the bottom union nut on the connecting hose.
    - ➲ Remove the connecting hose using an antistatic bag and store it in a fire-resistant cabinet.
17. Exhaust the powder outlet of the sieving station.
    - Use a suitable vacuum cleaner with a wet separator.
18. Clean the powder outlet of the station using a brush and a damp cloth.

6.3.3. Preparing the sieving station for a new sieving process

1. Attach a suitable connecting hose to the oversized grain outlet.
   - ➲ Tighten the top and the bottom union nut on the connecting hose.

2. Connect the powder bottle to the outlet for oversized grain.
   - ➲ Screw the bottle adapter for the sieving station onto an empty powder bottle.
   - ➲ Place the powder bottle onto the oversized grain outlet.
   - ➲ Close the clip around the outlet and the adapter.
   - ➲ Tighten the wing nut in order to lock the powder bottle.

3. Attach a suitable connecting hose to the powder outlet.
   - ➲ Tighten the top and the bottom union nut on the connecting hose.



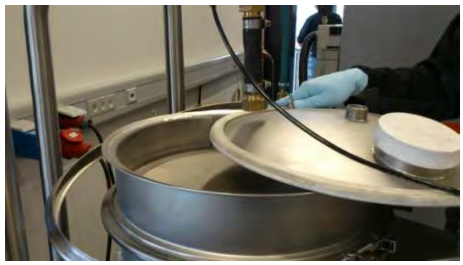
4. Insert a suitable sieving kit for the next powder which is to be used into the lower, fixed sieve frame.
5. Place the upper sieve frame on top.
6. Connect the grounding cable to the upper sieve frame.

NOTICE

Make sure when assembling the sieve frames and the sieve lid that they fit properly and that they are leaktight.

7. Close the clamping ring.

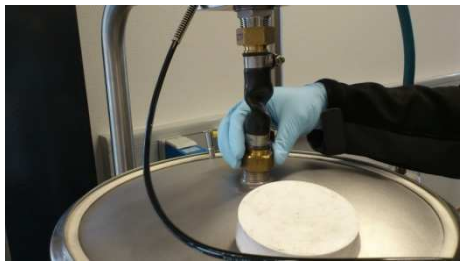
8. Place the lid on the sieving station.



9. Connect the grounding cable to the lid.

10. Close the clamping ring between the upper sieve frame and the lid.

11. Attach a suitable connecting hose to the powder inlet.
    - ➲ Tighten the top and the bottom union nut on the connecting hose.



6.3.4. Cleaning the sieving kit

NOTICE

If a sieving kit is used for sieving different metal powders, it must always be cleaned when there is a change of powder.

Clean the sieving kit carefully in order to avoid contamination of the metal powders.

1. Exhaust the sieving kit carefully and cautiously.
   - Use a suitable vacuum cleaner with a wet separator.
2. Clean the sieving kit on the outside with a damp cloth.
   - ➲ Clean the perforated metal plate.
   - ➲ Clean the sealing ring.
   - ➲ Clean the sieve frame.
   - ➲ Clean the sieve fabric.

3. Pull the sealing ring off the sieve frame.
4. Clean the sealing ring carefully with a damp cloth.

5. Take the perforated metal plate off the sieve frame.
6. Clean the perforated metal plate on both sides with a damp cloth.
   - ➲ Go into each hole with the cloth and give it a good wipe.
7. Remove the tap rings in the sieve frame individually.
8. Clean each tap ring on the inside and outside with a damp cloth.

9. Clean the sieving kit frame carefully on the inside and outside with a damp cloth.

NOTICE

Allow all of the components of the sieving kit to dry for at least 24 h before reassembling them. The sieving kit must be completely dry before it is used.

10. Allow the individual components of the sieving kit to dry in the air for at least 24 h.

11. Reassemble the sieving kit.
    - ➲ Place the tap rings into the sieving kit frame.
    - ➲ Place the perforated metal plate onto the sieving kit frame.
    - ➲ Pull the sealing ring over the edge of the frame and the edge of the perforated metal plate.
    - ⇨ The sieving kit can now be inserted into the sieving station.
      (See Chapter *6.3.3 Preparing the sieving station for* a new sieving process)

6.3.5. Replacing the H14 filter

1. Remove the cover on the filter housing.
2. Remove the filter mat with an antistatic bag.
3. Immerse the filter in the grinding oil in the filter safety container. Make sure that the filter is completely immersed!

NOTICE
Dispose of the filter after replacing it in accordance with the local, official regulations. Cleaning and reuse of the filter outside of the sieving station is not permitted.

4. Insert the new filter (article number: 90525) into the filter housing.
5. Shut the cover on the filter housing.

7. Help with faults / troubleshooting

7.1. Activating the EMERGENCY STOP switch and restart after activating the EMERGENCY STOP

WARNING

Danger of injury if safety devices are not working properly!

If safety devices are not working properly or have been rendered inoperative, there is the risk of serious injuries.

↗ Before starting work, check whether all safety devices are in good working order and have been installed correctly.

↗ Never override or bypass safety devices.

↗ Ensure that all safety devices are accessible at all times.

In the event of any danger to people or the risk of damage to the machine, the EMERGENCY STOP switch must be pressed immediately.

When the emergency stop switch is pressed, the sieving station comes to a safe standstill.

In a safe standstill:

– the current sieving process is interrupted immediately,
– all drives are shut down,
– the inert gas supply is interrupted and
– all pending control commands are reset.

⇨ The EMERGENCY STOP reset illuminated button is lit up red.

WARNING

Danger of injury from uncontrolled restart!

An uncontrolled restart of the machine may result in serious injuries.

↗ Make sure before restarting the machine that the cause of the emergency stop has been rectified and that all safety devices are in place and in good working order.

↗ Only unlock the emergency stop switch when there is no longer any danger.

The EMERGENCY STOP switches should only be used in a dangerous situation. For a normal switch-off of the sieving station, the main switch should be activated.

The sieving station must be shut down immediately if there is any risk to people, equipment or the environment:

➲ Press the EMERGENCY STOP switch of the sieving station.

⇨ The sieving process will be stopped immediately.

➲ Wait for the sieving station to shut down.

➲ Remove the hazard.

➲ Release the EMERGENCY STOP switch again.

➲ Activate the emergency stop reset button.

⇨ The emergency stop reset indicator light will go out.

7.2. Removing excess pressure

If an excessively high pressure is prevailing in the sieving station as a result of the flooding in of the inert gas, the excess pressure closure is opened.

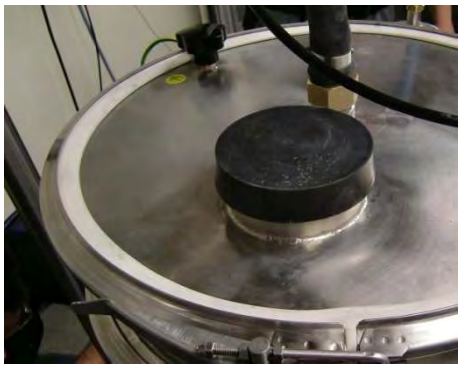


Figure 8: Excess pressure closure

Cause	Measure
Excessively large volume flow when the inert gas is flooded in	Reduce volume flow
Filter on the gas outlet clogged	Replace filter

7.3. Eliminating leaks

If there are any leaks, the required residual O_2 value is not reached and powder dust escapes from the sieving unit.

Cause	Measure
Sealing rings are damaged	Insert new sealing rings
Clamping rings are not correctly sealed shut	Check the fit of the components and clamping rings (also note the other relevant documents in relation to this)

8. Settings of the sieving station

8.1. Sieving time

The respective sieving time can be read off the main screen. The figure can be changed by clicking on the sieving time which is set on the touch screen.

Figure 9: Standard view of display

8.2. Limit concentrations - flushing times

To get to the menu containing the settings for the limit concentrations of the residual oxygen content and the flushing times, you need to call up the "System View" - "Parameters" menu on the touch screen: password: 949.

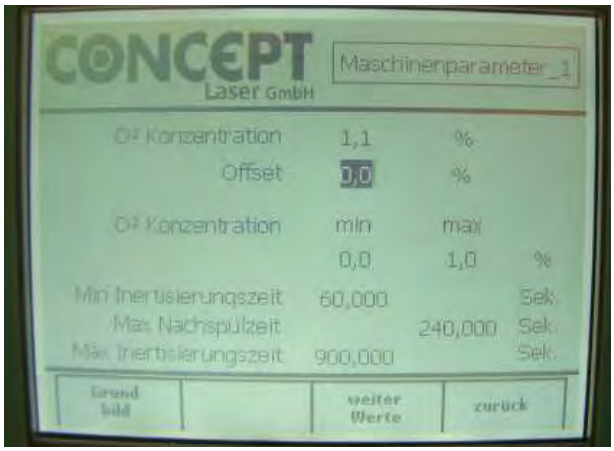


Figure 10: Standard settings of the parameters

The following settings can be made:

Parameter	Setting
O_2 concentration min	➲ Set the value to 0.0. ▪ This ensures a constant feed of the inert gas via the small valve.
O_2 concentration max	➲ Set the upper limit for the oxygen content to 1.0. ▪ If this is exceeded, inert gas is supplied using the large valve.
Min. inertization time	➲ Flushing must always take place for at least 60 sec. because the oxygen sensor is situated behind the filter at the gas outlet. This time is required to ensure a complete circulation of the gas volume in the sieving station.
Max. reflushing time	➲ If during the sieving process the O_2 content rises above the upper residual O_2 limit with the small valve open, the large valve is opened for the duration of the preset max. reflushing time. ➲ If the value does not drop below the upper limit during this time, the sieving process is terminated.
Max. inertization time	➲ Within this time, the residual O_2 content must fall below the upper residual O_2 limit. ➲ If this is not the case, the sieving process is terminated.

9. Accessories, wearing and spare parts

NOTICE

When you replace defective components, they should be replaced exclusively by original parts with the same mechanical data as otherwise the safety and correct functioning is no longer guaranteed. This also applies to accessories and attachments.

Item			Article No.
9.1	PPE (Personal Protective Equipment)	Respirator mask P2 or P3 Protective goggles Gloves	90128 (9.1-9.3)
9.2	ESD safety equipment	ESD armband with grounding cable	
9.3	Heat protection gloves		
9.4	Sieving kit 63	Sieve fabric 63 µm with frame, perforated metal plate, tap rings, seal	90651
9.5	Hose kit	3 hoses for powder inlet, powder outlet and oversized grain outlet incl. mounts	90652
9.6	Bottle	PE bottle 2 l Disc valve and flange	90374 90684
9.7	Brush kit	4 different diameters	90676
9.8	Seal	For sieve (white)	91163
9.9	H14 filter		90525
9.10	Standard container	Not to be opened, not for cleaning.	90645
9.11	Master container	To be opened for cleaning work.	90570
9.12	Ruwac wet separator NA 35 D1B1 TYPE III	Non-oxidized reactive materials must not be sucked up using a commercially available industrial vacuum cleaner under any circumstances. This must be done using a vacuum cleaner with a wet separator which is suitable for sucking up combustible metallic dusts.	90577
9.13	Antistatic dust bag	Non-cleaned connecting hoses or filter inserts are transported in antistatic dust bags.	90360
9.14	Bellows with connections	Bellows on powder container, taper flange, hose clips	90692

10. Support and customer service

Our customer service department is available to provide you with any technical information you may need:

Address	Concept Laser GmbH
Department	Customer service
Address	An der Zeil 8 96215 Lichtenfels
Telephone	+49 (0) 9571 1679 444
Fax	+49 (0) 9571 1679 499
E-mail	service@concept-laser.de
Internet	www.concept-laser.de

In addition, we are always interested in receiving information and experiences which are produced from use of the machine and may be valuable in helping us to improve our products.

11. EC declaration of conformity

EC conformity declaration according to machine directive (2006/42/EC)

The manufacturer: Concept Laser GmbH
An der Zeil 8
96215 Lichtenfels

declares herewith, that the machine

Product description: QM powder
Serial Number: XXXXXXXX

conforms to the requirements of the following directives:

- Machine directive 2006/42/EC
- EMC Directive 2004/108/EC
- ATEX directive 94/9/EC
- The safety objectives of Low Voltage Directive 2006/95/EC have been met in accordance with Annex I, Nr. 1.5.1 of directive 2006/42/EC.

Applied harmonised standards:

EN ISO 12100-1:2003	Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology (ISO 12100-1:2003)
EN ISO 12100-2:2003	Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles (ISO 12100-2:2003)
EN 60204-1:2006	Safety of machinery – Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005 (modified))
EN 61310-3:2008	Safety of machinery – Indication, marking and actuation – Part 3: Requirements for the location and operation of actuators (IEC 61310-3:2007)

“Authorized representative” for technical documents within the European Union:

Frank Schödel
An der Zeil 8
96215 Lichtenfels

Location: Lichtenfels
Date: 01.12.2009

Frank Herzog (President and CEO)

12. List of figures

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