Individual Clean Room Systems
Planning – Realization – Service

PRODUCT BROCHURE

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Hydrogen Peroxide Gas Generator

Geschko MLT 11 for decontamination of rooms up to 600m^3
Geschko MLT 11i for fast gassings up to 7000ppm
Geschko MLT 11m for decontamination of rooms up to 100m^3

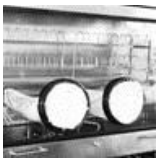
Sluices

Disinfection transfer hatch for temperature-sensitive goods
Disinfection sluice for temperature-sensitive goods, accessible

Hydrogen Peroxide Sluice

Air Washing Sluice

Doors



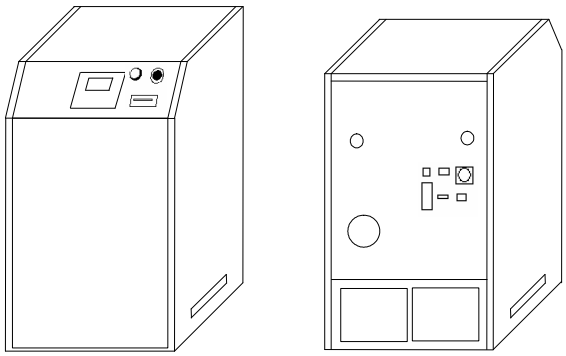
Isolators

Distillation Plants

The decontamination of enclosures with big volumes is a basic process, to provide suitable requirements for sterile productions in numerous manufacturing branches such as the pharmaceutical, biotechnological or food industry.

The PEA hydrogen peroxide gas generator **Geschko MLT 11** is intended and constructed for the use of surface disinfection and specifically for the safe and effective decontamination of pure areas. It is therefore not only a rapid and controlled but also a non-polluting alternative to the current decontamination with formaldehyde.

Different kinds of enclosures up to a volume of 600 m³ can be decontaminated with the Geschko.



The unit stands on wheels and this mobility allows the usage in different places. As an alternative, the **Geschko MLT 11** is also available as an integrated element of a superior clean room unit, such as a material sluice or an isolator with about 10 to 30 m^3 volume. The electric supply takes place via a standard plug. The flexible hoses for the supply and discharge of gas can be hooked up to every enclosure which is to be decontaminated.

The method of pre-conditioning used here and the introduction of disinfectant via vaporizing are efficient and progressive.

- The enclosure has to be dehumidified beforehand, so that the hydrogen peroxide can distribute itself better and faster.
- The dehumidification of the air is achieved by cooling, so that no regeneration period is necessary.
- The treatment with hydrogen peroxide is the most non-polluting method of disinfecting enclosures.
- The decomposition is done over a disintegration catalyst.

The operation of the generator can only be done with the help of the operation panel (OP). The different programs are started and can be changed via soft keys. All important parameters and data are accessible via the monitor. This applies also for the consumption of the hydrogen peroxide and the temperatures.

Please Note

The **Geschko MLT 11** can only be used for the decontamination of enclosures. These enclosures can have a volume up to 600m³ and they have to fulfil the following qualifications:

- gas tightness
- no open stored chemicals.
- all materials (walls, closets, shelves, tools, apparatus and so on) in the enclosure have to be stable to hydrogen peroxide.

It is not allowed to treat open systems.

The **Geschko MLT 11** is especially qualified for hydrogen peroxide. It is only allowed to use 30% to 35% hydrogen peroxide solution and no other disinfectants.

Technical Data MLT 11

Dimensions (L x H x D)	630 x 1230 x 1220 mm (mobile)
Capacity	1 to > 600 m³ (in gastight enclosures)
Flow rate	ca. 40 to 90 m³/h
Pressure	not adjustable (**optional**: +20 to +200Pa)
H_2O_2-Container	5 litres (standard)
Disinfectant	30 to 35% hydrogen peroxide solution
Dosage	by dosing pump, program controlled distribution-nozzles
Hydrogen peroxide-flow rate	0,1 to 12g/min (with a 35% solution)
Filter	HEPA-Filter EU13
Cooling/ Preconditioning	2-stage cooling- and preconditioning system with coolant R 134A and R 404A
Catalyst	platinum, aluminium oxide
PLC (Programmable Logic Control)	Siemens SPS S7-314 (Option: 314C-2-DP)
Operation Panel	Siemens HMI OP 177B
Print out	External A4 printer
Interface	Printer (net, USB)
Power connection	230V/50Hz, 16A
Rated input	3500W
Hose connection	DN 40, Camlock-fastener lockable connections; the two hose assemblies are placed at the rear side of the unit. Each hose is fitted with a female Camlock-coupling which activates a ‘hose connection switch’ to control the hose connections

Geschko MLT11i

The technical data are the same but with additional options

Technical Data MLT 11m

Dimensions (L x H x D)	650 x 1230 x 1100 mm (mobile)
Capacity	1 to > 100 m³ (in gastight enclosures)
Flow rate	ca. 40 to 70 m³/h
Pressure	not adjustable (**optional**: -200 to +200Pa)
H_2O_2-Container	up to 5,5 liter
Disinfectant	30 to 35% hydrogen peroxide solution
Dosage	by dosing pump, program controlled distribution-nozzles
Hydrogen peroxide-flow rate	0,1 to 10g/min (with a 35% solution)
Filter	HEPA-Filter EU13
Cooling/ Preconditioning	2-stage cooling- and preconditioning system with coolant R 134A and R 404A
Catalyst	platinum, aluminium oxide
PLC (Programmable Logic Control)	Siemens SPS S7-314
Operation Panel	Siemens HMI 177B
Print out	External A4 printer
Interface	Printer (net, USB)
Power connection	230V/50/60Hz, 16A
Hose connection	DN 40, Camlock-fastener lockable connections; the two hose assemblies are placed at the rear side of the unit. Each hose is fitted with a female Camlock-coupling which activates a ‘hose connection switch’ to control the hose connections

Hydrogen Peroxide Gas Generator with Siemens Control PLC S7-314 and HMI Siemens OP177B


SIEMENS
SIMATIC PANEL
TOUCH
PEA
ABBREVIATED USER MANUAL
SAFETY NOTES

Hydrogen Peroxide Gas Generator

together with a sluice

Sluices

The PEA sluice systems serve to transfer objects and materials into enclosures with high hygienic requirements. Depending on the construction, they consist of a chamber, which can be reached through two or more sluice doors. They are for instance made of hardened glass with polished edges, with double disks, in order to insert a dynamic seal, or stainless steel with or without a viewing window.

The door hinges are manufactured out of stainless steel and are three-dimensional adjustable. The doors are bolted electrically against each other in order to prevent the simultaneous opening of two doors. The door status is shown by signal lamps or comfortably displayed over an operation panel on all sides of the sluice.

In- as well as outgoing objects are brought in over the sluice doors, which are bolted against each other, and remain inside the sluice.

Consider a person in the sluice (in bigger sluices), in case of emergency this person can open the sluice from the inside by an integrated emergency switch.

All produced sluices are manufactured individually and are available in all sizes and forms in accordance with the customer’s wish. All sluices, manufactured by PEA GmbH, are made of stainless steel and they are disinfectible with all current disinfectants.

Our sluices are not only available as pure transfer hatches, aerated transfer hatch sluices, air washed sluices, per-acetic acid sluices and hydrogen peroxide sluices, but also as exchange sluices or fully automatic disinfection transfer hatches. Person sluices and compulsory showers also belong to our product program.

Sluice Door

Sluice Door

with integrated transfer hatch

Small Sluice
Impure Side

Sluice door

with pneumatic seal pure side

Sluice door

OP7 Siemens PLC

Disinfection Transfer Hatch for Temperature-Sensitive Goods

The disinfection transfer hatch is integral and serves to transfer temperature-sensitive goods between enclosures of different purity levels.

With the help of a rack construction, made up of stainless steel, the chamber of the disinfection transfer hatch will be fitted with all technical aggregates and coverings in a built-in niche. Afterwards, a gastight separation between the pure and impure area with ground-, wall- and ceiling-connection will take place.

The disinfection transfer hatch can be set up beside an autoclave, for instance. The front side on the impure side finishes gastight with the wall of the autoclave. All maintenance works take place from the impure side.

The chamber is locked with pneumatically sealed revolving glass doors, consisting of laminated safety glass, equipped with stainless steel profile U-frames and with a pneumatical seal. For the inspection of the tightness, the chamber can be filled with compressed air before a disinfection program is started. For the pressure control, the unit is equipped with a manometer on the impure side (accuracy class 1 in accordance with DIN EN 837 part 1-6). The chamber doors are closed reciprocally and have to be locked automatically during the decontamination.

The chamber of the transfer hatch has lockable openings for the connection of a hydrogen peroxide gas generator. The connections are provided with electro pneumatic membrane valves for incoming - and outgoing air. The chamber is aerated from the pure side after every disinfection and before a door is released. This aeration is started automatically after every decontamination cycle. The exhaust air is introduced into the exhaust air canal.

The transfer hatch can be connected to the external MSR-system. The hardware components for this are accommodated in a switchboard above the chamber. The pure and impure areas can be connected with each other by an interphone. The charging of the installation can take place by means of a charging car. If so, the outside edges of the chamber floor are designed in a way that the service personnel can push the baskets with the sterile goods by a transportation car, with a height of 85cm, into the chamber.

Dimensions	Internal dimension of chamber by customer's requirement, for example: 56 x 70 x 56 cm (W x D x H)
Material	Sluice chamber/Aeration channels: Stainless steel 1.4301 or 1.4571 Frames, Covers: stainless steel 1.4301 Flaps stainless steel
Exhaust Air	By customer's requirement
Connection	400V/50Hz/32A
Compressed Air Connection	5bar Connection to potential equalisation

Disinfection Sluice for Temperature-Sensitive Goods, accessible

The disinfection sluice serves to transfer temperature-sensitive goods from an impure to a pure side.

Chamber

The construction of the chamber consists of stainless steel; it is welded, gastight and has in addition to that 2 gas-tight doors, to separate the pure from the impure area with floor, wall and ceiling connection.

The disinfection sluice can be built into a wall recess or be set up beside an autoclave, for example. Then the unit's leading edge on the pure side finishes gas-tight with the wall of the adjoining plant. All maintenance works and the provision as well as the disposal of disinfectional solution take place from the impure side. For maintenance purposes a corresponding revision lid is provided. The sluice separates two enclosures of different purity level gas-tight from each other. The connection of the sluice to the supply and exhaust air, as well as to the disinfectional medium hydrogen peroxide, takes place over a fixed pipe installation made out of stainless steel.

Doors

The disinfection sluice is locked with pneumatically sealed glass doors that are equipped with stainless steel profile U-frames. As a matter of course, the glass used is laminated safety glass; the U-profile is supplied with a pneumatic seal.

For the inspection of the tightness, the chamber can be filled with compressed air before a disinfection program is started. For the pressure control, the unit is equipped with a manometer on the impure side (accuracy class 1 in accordance with DIN EN 837 part 1-6). The chamber doors are closed reciprocally and have to be locked automatically during decontamination.

A lamp which is gas-tight towards the chamber is put up on the ceiling of the disinfection sluice. Also, a socket (230V, 16A, gastight) is installed on a lower side of a wall, gas-tight, in IP 66.

After each disinfection and before a door is released the sluice is aerated over a supply filter from the pure side. After the course of an interval, the aeration is started with a signal of the superior unit (e.g. hydrogen peroxide gas generator). The exhaust air is led off into the exhaust duct.

The sluice is connected to the MSR-System. The hardware components are therefore placed in an electronic board above the chamber. The pure area can be connected with the impure area by an interphone.

Isolation Flap Aeration

The flaps are controlled by the operation panel. They are suitable to shut off single areas from ventilation technical units with proven leak tightness according to KTA 3601 and respectively DIN 25414 (maximum leakage 0.01m3/h x m2 with a pressure difference of 2000 Pa) and reassure-resistant up to 5000 Pa. The mechanics of the flaps are constructed in a way that no energy is necessary after the closing to keep the flap closed. The supply and exhaust regulation for the disinfection sluice also takes place over gas-tight magnetic valves.

The sluice chamber is delivered ready for use and mounted. Before the initial operation, a leakage test is being carried out.

Dimensions	Internal dimension of chamber by customer's requirement, for example: about 120 x 200 x 200 cm
Charging height	By customer's requirement, for example 85cm
Material	Sluice chamber, aeration channels Material 1.4571 and 1.4435 Frame / Covers: material 1.4301 Lids: stainless steel
Required Media	Compressed air Electricity Supply and outgoing air

Hydrogen Peroxide Sluice

The constantly raising of hygienic requirements in the fields of pharmacy, biotechnology and gene technology demand validate solutions for a sterile transfer of process material and equipment into highly sensible clean room areas.

Especially when transferring a large number of materials the
“PEA Hydrogen Peroxide Sluice” is suitable. The material sluice possesses an integrated hydrogen peroxide decontamination, which guarantees a high reproducibility of the processes.

Advantages of Hydrogen Peroxide-Decontamination

In connection with raised room temperature, the hydrogen peroxide decontamination is extremely effective against pathogen and apathogen microorganisms. Consequently, materials and equipment that cannot usually be sterilized by heat can be treated now.

Because of the catalytic decomposition of surplus hydrogen peroxide into water and oxygen, there are no residues which can affect the operator or environment in a harmful way.

Course of the Decontamination Process

A hydrogen peroxide solution is vapourized by the integrated generator and blown into the circulation air flow of the material sluice. This turbulent flow distributes the mixture continuously over the time of effect. Afterwards, the sluice is rinsed automatically via the integrated catalyst until the permissible MWC-value is reached.

The individual processing steps are monitored continuously via sensors. Due to the existence of different production processes and their requirements of decontamination, PEA GmbH developed more than eight different decontamination programs.

System Description

Due to the integration of the entire plant engineering in the upper housing area, the required space of the material sluice is narrowed to the necessary platform. The overall construction consists of high-quality stainless steel, whereas the inner surfaces can be executed electrolytic polished for a better cleaning.

The sluice possesses a generous spacing for convenient charging and unloading.
Due to even door sills, the accessible construction guarantees a problem-free working with transporter wagons and process apparatus equipped with rolls. The smaller version has integrated tracks for a better handling.

Also, perforated plate shelves can be installed, which can be flipped up when needed. The smooth-running sluice doors are made out of single disc safety glass and provided with dynamic seals.

Technique

The entire plant engineering is placed space-saving in the upper housing area. That way, disturbing media conductors or external components do not apply.

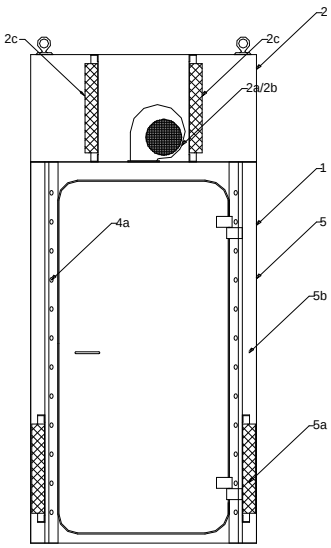
The system control takes place via a Siemens S7 PLC. The maintenance of the plant engineering takes place from the impure side and the interior of the sluice, so that there are no disturbances considering the clean room class. Using a self-sufficient system control and unit operation, a supplementary system-level integration into the existing clean rooms or laboratories are possible.

Air Washing Sluice

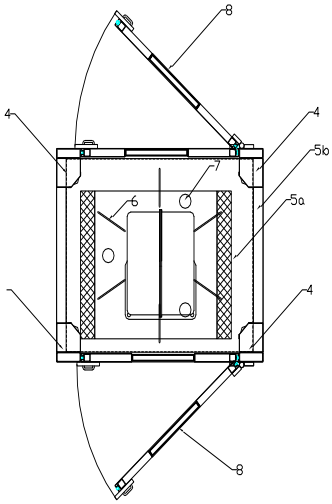
Air washing sluices are meant to prevent the transfer of dust particles to the pure side by an entering person.

PEA offers air washing sluices made out of stainless steel for all clean room classes. Herewith all persons entering a clean room are passing an effective air wash in advance. Therefore the transfer of dust particles can be almost avoided.

An outstanding attribute of the air washing sluice is the modular concept. Because of this the air washing sluice can also be used as a gasable material sluice (option).



Main components are the cabin of the sluice 1 and the traction module 2 (picture 1). The cabin of the sluice consists of four inflow channels 4 which are arranged diagonally from each other with 12 out coming nozzles 4a, two wall units 5 with preliminary filters 5a and a re-circulating air stack 5b, the air outlet 6, the lamp 7 as well as two doors made out of safety glass 8. The unit of the traction module includes a fan 2a with motor 2b, the two airborne particle filter cells 2c and a control cabinet 2d. Because of the modular concept the sluice cabins can be equipped with doors opposite of each other for straight trespassing or with doors in a 90° corner position. The attachment of the doors can be chosen for right or left side. In the standard version of the air washing sluice the sluice cabin and the unit of the traction module are made out of stainless steel No.1.4301.



System Description

After a person enters the sluice a fan is activated and pure air is blown through the nozzles with high velocity and heavily impulsed. The air streams cover the whole surface of the clean room clothing, detach the dust particles and aerosols and remove them with a rotation stream to the filter system – supported by the spin effect out of the air passage. During this the circulation air passes the preliminary filter 5a, re-circulating air stacks 5b as well as high efficiency submicron particulate air filters 2c and flows to the chamber again (as already described above).

Technique
The entire technique of the unit is placed space saving in the top of unit's housing. There are no disturbing media circuits or external attached apparatuses.

The unit is controlled with a Siemens S7 SPS. The maintenance of unit's technique can be done from the impure side and from the interior of the sluice. Because of this there is no disturbance of the clean room class. It is also possible to integrate the system to an already existing clean room and laboratory because of the self-sustaining control and technology of the unit.

If you want to airwash material, we also deliver aerated transfer hatches.

Gas-tight Door Elements

The gas-tight door elements are built into the wall of the enclosure that has to be sealed, so that they guarantee a safe closing towards the impure side.

Door

Steel edges suitable to the separating plate are intended to align double-sided to the wall, Profile cylinder, already pre-adjusted, and doorknobs made out of stainless steel, connection to potential equalisation.

Door-/Edge Material

Stainless steel 1.4301, surface 220/240 corn grinded, semi gloss

Door Sheet

The door sheet is constructed double-sided and about 40mm thick. Both half-shells are pasted up with a hard PU-core. In the range of the fitting parts fortification profiles are incorporated. By the assembly of the half-shells a buckling resistant profile results on the size for the intake of the pneumatic seal. The door sheet is absolutely gastight, hallow space- and crack free in this build-up.

Edge

C-profile with an edge of 100 mm. The gas-tight operating elements as well as the coupler connection for the compressed air supply are located there. The running of cables takes place over ductworks within the C-profile. The fixation of the edge to the wall or rack plant is carried out by welding bottles. The hollow space is filled up with PU-foam. The gap between edge and wall is permanent elastic gastight fit flushed. In the range of the bedplate screed is to be omitted. The built-in height of the bedplate is ‘top edge finished floor’. The both-sided gap between the finished floor and the bedplate profile is permanent elastic gas-tight fit flushed.

Sealing

The compressed air seal has a self placing back profile. In non-pressurized condition the sealing surface is rolled inwards and thereby protected against damages. Only with air inlet the sealing is exposed, whereas two adjoined seal lines are built. The supply of the compressed air to the sealing takes place over a coupling, whose connecting parts are mounted on the door sheet and the edge. By the assembly of both coupler parts the compressed air connection is established or interrupted.

Interlocking
The doors are closed automatically, pneumatic seals guarantee gas tightness, additionally a mechanic lock is intended. The closing is automatic; the sealing gets blown up when closing the door. The opening takes place by a gas-tight sensing device which should cause on the one hand the mechanic opening of the sealing and on the other hand a pneumatic release of the seal. The process of opening is connected with a door circuit, which is operated by PLC program. The condition of the door is displayed by signal lamps on both sides of the door. To forward a signal a potential free contact has to be provided on the door.

More door operating elements are:

- compressed air connection
- connection for vacuum
- 230V connection, the following conditions apply here:
  without current ->door open
  current ->door closed

In case of emergency, the door is switched off from current by an external emergency switch, which is delivered and built in. Now the door opens.

Enclosure Requirements

The leakage rate of the entire door which is already built in can be 5l/day maximum with a pressure differential of 200Pa.

The surfaces have to be completely even, without projecting edges or horizontal dust disposal surface areas. Additionally, they are resistant against acids, alkaline solutions and customary disinfectant and also easy to clean.

The number of element joints (also ceiling and wall connecting joints) should be kept at a minimum. They also have to be sealed up with neutral reticulating silicon, which has to be at the same time bactericidal and fungicidal as well as age- and UV resistant.

Isolators

The isolators are developed by PEA GmbH and are easy to use.

The isolators serve as a protection for the laboratory animals against viruses and bacteria or could even be used as quarantine stations for genetically modified animals. For this purpose, they are designed for 5 rat or 18 mouse cages or –as larger units- for 96 rat or 200 mouse cages.

Further fields of application are product safety when manufacturing sterile materials and personnel safety when working with toxic substances such as cytostatica.

Of course, the isolators are also suitable in the area of quality control and sterility testing.

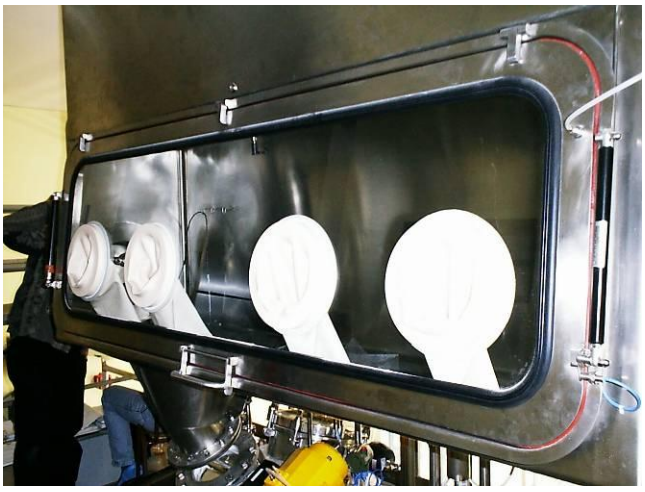
The glove isolator manufactured from stainless steel corresponds to the purity level A for air according to EG guidelines; class 100 to the US Federal standard 209E, or class 3 according to VDI 2083 and consequently provides high personal protection, product protection and protection against cross contamination.

Maintenance work is mostly conducted through the front plate, security parameters monitored continuously. The stainless steel construction of the entire working environment facilitates the cleaning of the cabin.

Cytotoxic-Isolator for Hospitals

Sterility Test Isolator

Production Isolator Connected to a Mixing Pressure Vessel



Vapour or Electro-Heated Multiple Stage Water Distillation Plants

PEA GmbH has been developing water distillation units with storage containers and distribution systems for the manufacturing of WFI (Water for Injection) according to the Pharmacopeia Europe (Pharm. Eur.) for many years. Not only do numerous big pharmaceutical companies possess our units, PEA GmbH is also strongly represented in hospital pharmacies.

Principle of construction:	Multiple-stage water distillation plant or single-level water distillation plant
Number of columns:	1 to 8
Heating:	Industrial vapour
Production:	Fully automatic
Production capacity:	25 to 7.000 l/h WFI
Distillate quality:	According to USP, Pharm.Eur., DAB, BP, free of particles, salts, pyrogens (endotoxins)
Specification:	According to GMP-control equipment of the WHO, PIC, EG, FDA
Functioning:	Multiple-stage distillation plant consists of at least 2 up to max. 8 vapourizing columns. The first column gets heated by an external heating steam (saturated steam). The feed water is led by the reverse flow through the entire unit and becomes heated up from one stage to the other until it has almost reached the vapourizing temperature in the first column. The high-purity vapour of the first column is used as heating steam for the second column. The high-purity vapour of the second column is used as heating steam for the third column and so on. The vapour of the last column gets condensed to distillate by two coolers. The vapour usually leaves the unit with a temperature of 92 to 98°C, The efficiency of the multiple-stage water distillation plant depends on the available industrial vapour pressure as well as on the dimension of the single columns.
Construction:	During construction we pay attention to the product tangent parts which are employed demonstrable according to pharmaceutical assertion. This applies to construction details, materials, surface qualities and so on. A FDA-conform construction of the heat exchanger makes sure that there is no possibility of contamination of the pure product by cooling water.

Vapour or Electro-Heated Multiple Stage Water Distillation Plants

Programmable logic controller (PLC):

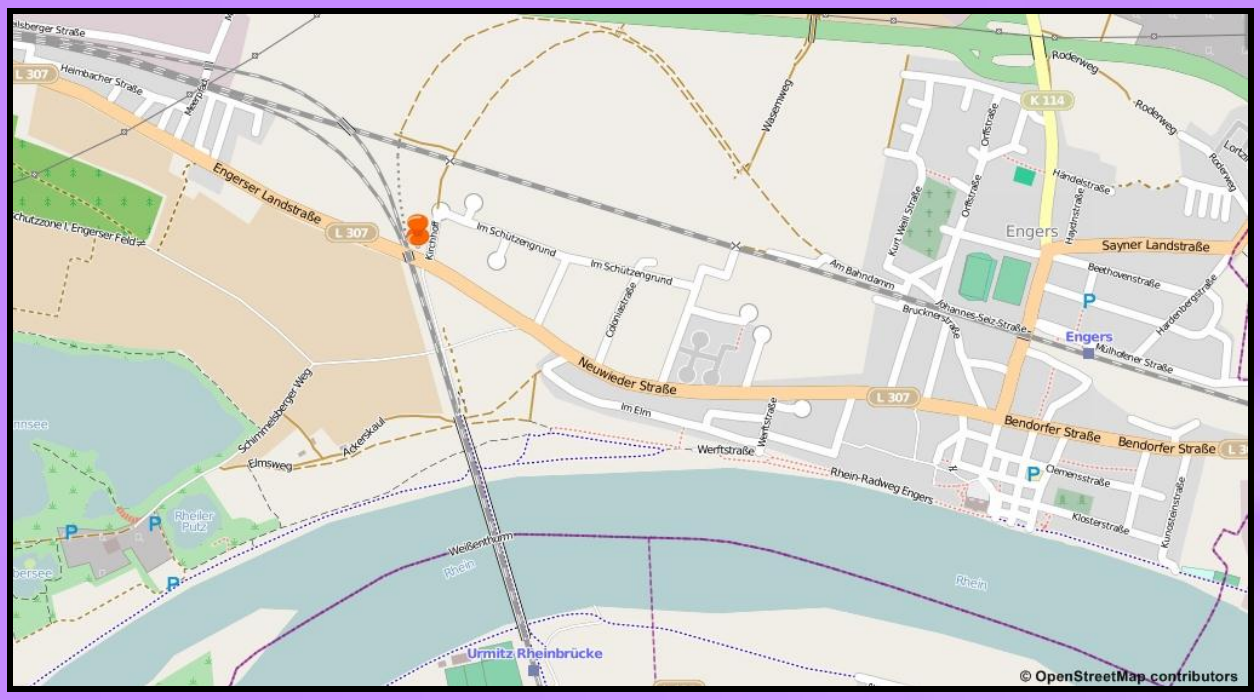
The operation of the unit takes place by a Siemens-SPS (S7-300). All process relevant parameters are shown by the operation panel. Besides alert messages are displayed all the time and the status of the unit can be called off anytime. The status of the unit is controllable due to the telephone transfer of the data by the service department. Maintenance and repairing costs are reduced significantly thereby.

Special Advantages:

- Absolutely safe droplet deposition
- Pharma-compatible documentation, incl. Hand book for validation
- Special appliance for an even distribution of the feed water to the individual tubes of the heat
- Less energy input during the production of “Water for Injections”
- Through process optimization, our units do not require coolant anymore

Have we aroused your interest?
Would you like to know more about our products?
Feel free to ask as, we will help! As usual!

How to find us:



110km away from Frankfurt am Main airport (FRA):

- **leave A3 toward “Mainz” and drive onto A48**
- **leave A48 toward “Bendorf/Neuwied”**
- **drive onto L307 and follow it**
- **turn right on “Im Schützengrund“**

80km away from Köln/Bonn airport (CGN):

- **A3 toward “Frankfurt am Main”**
- **leave toward “Neuwied” and drive onto B256; follow it**
- **take exit “Neuwied-Engers” onto L307**
- **turn left on “Im Schützengrund“**

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