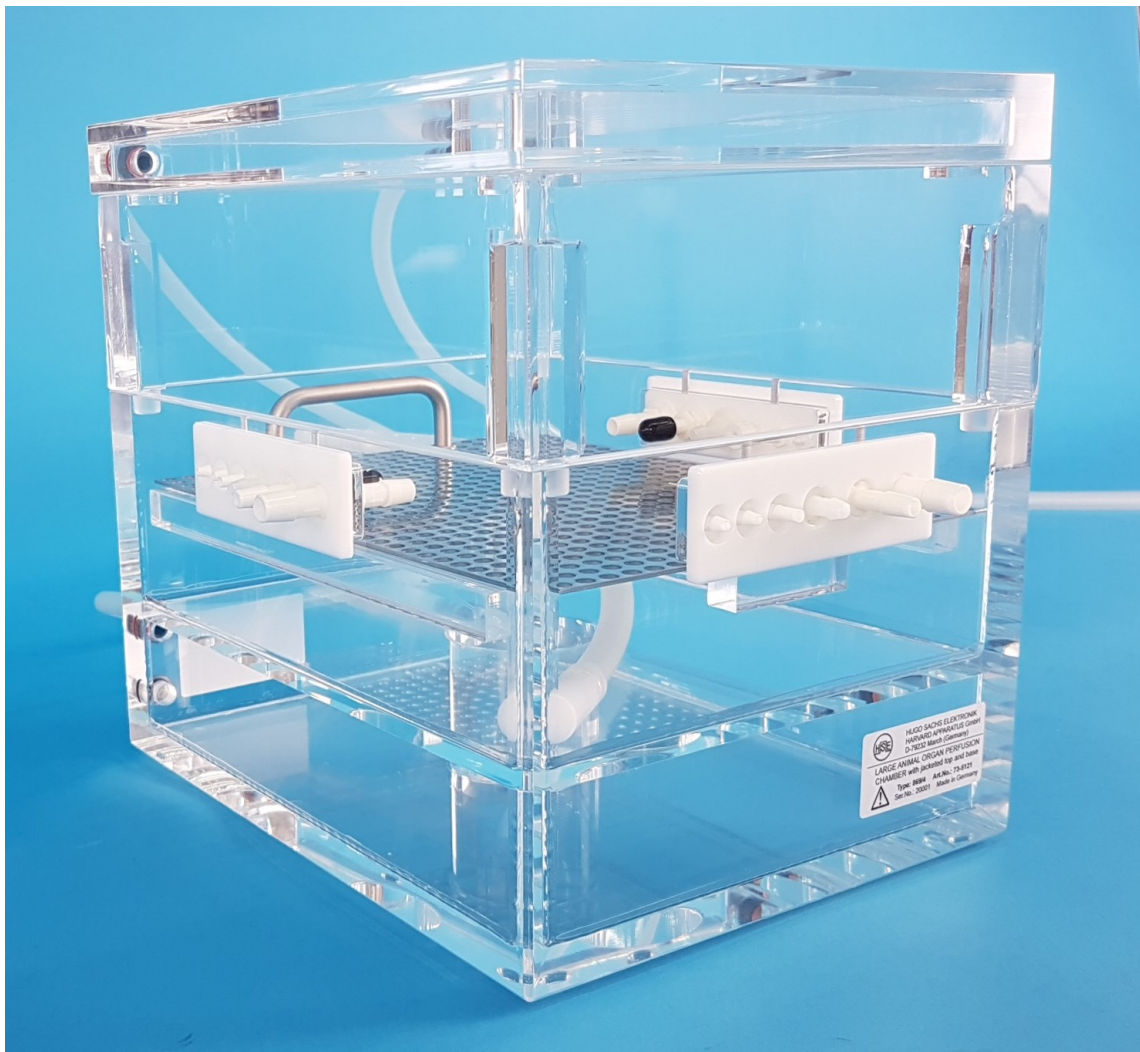


OPERATING INSTRUCTIONS

Large Animal Organ Perfusion Chamber 73-5121

with jacketed top and bottom



NOT FOR HUMAN USE

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Warranty

This device is for research use only

Manufacturer:

Hugo Sachs Elektronik-Harvard Apparatus GmbH
Gruenstrasse 1
D-79232 March-Hugstetten Germany
Phone: +49(0)7665/9200-0
Fax: +49(0)7665/9200-90
email: info@hugo-sachs.de

Hugo Sachs Elektronik (HSE) warrants the Large Animal Organ Perfusion Chamber (73-5121) for a period of one year from the date of purchase. At its option, HSE will repair or replace the unit if it is found to be defective as to workmanship or materials. This warranty does not extend to any instrumentation which has been (a) subjected to misuse, neglect, accident or abuse, (b) repaired or altered by anyone other than HSE without HSE express and prior approval, (c) used in violation of instructions furnished by HSE. This warranty extends only to the original customer purchaser. IN NO EVENT SHALL HSE ELEKTRONIK BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states and regions do not allow exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR USE, OR OF ANY OTHER NATURE. Some states or regions do not allow this limitation on an implied warranty, so the above limitation may not apply to you. Without limiting the generality of the foregoing, HSE shall not be liable for any claims of any kind whatsoever, as to the equipment delivered or for non-delivery of equipment, and whether or not based on negligence. Warranty is void if the device is changed in any way from its original factory design or if repairs are attempted without written authorization by HSE. Warranty is void if parts or connections not manufactured by HSE are used with the equipment. If a defect arises within the warranty period, promptly contact Hugo Sachs Elektronik, Gruenstrasse 1, D-79232 March-Hugstetten Germany by phone at +49(0)7665/9200-0 or email sales@hugo-sachs.de. In the USA, call 800-272-2775 or 508-893-8999 or email: support@hbiosci.com.

Goods will not be accepted for return unless an RMA (Returned Materials Authorization) number has been issued by our customer service department. The customer is responsible for shipping charges. Please allow a reasonable period of time for completion of repairs, replacement and return. If the unit is replaced, the replacement unit is covered only for the remainder of the original warranty period dating from the purchase of the original device. This warranty gives you specific rights, and you may also have other rights, which vary from state to state.

Out of Warranty Service

Proceed exactly as for Warranty Service on previous page. If our service department can assist you by phone or other correspondence, we will be glad to help at no charge. Repair service will be billed on the basis of labour and materials. A complete statement of item spent and materials used will be supplied. Shipment should be prepaid. Your bill will include return shipment freight charges. Disassembly by the user is prohibited. Service should only be carried out by experienced HSE technicians.

Repair Facilities and Parts

HSE stocks replacement and repair parts. When ordering, please describe parts as completely as possible, preferably using our part numbers. If practical, enclose a sample photo or drawing.

Safety Information

Please read the following safety precautions to ensure proper use of your perfusion chamber. If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

Use suitable thermocirculator

Use only thermocirculators which don't exceed a pressure of 350mbar (5psi) to avoid damage of the chamber and the lid. Check label at the ports of the chamber.

Review the operating manual to learn the ratings on all connections.

- Never use alcohol or alcohol containing fluids for cleaning. Tested fluids for cleaning are MUCASOL, RBS35 and CIDEX OPA, refer to the Chemical Behaviour list at the end of this manual if you use chemicals.
- Do Not Operate with Suspected Failures
- If damage is suspected on or to the product do not operate the product. Contact qualified service personnel to perform inspection.
- Orient the Equipment Properly
- Do not orient the equipment so that it is difficult to manage the connection and disconnection of devices
- Place Product in Proper Environment
- Review the operating manual for guidelines for proper operating environments.
- Observe all Warning Labels on Product
- CAUTION Refer to manual. Read all labels on product to ensure proper usage.

Caution Notice

CAUTION: FOR RESEARCH USE ONLY. NOT FOR CLINICAL USE ON PATIENTS.

The unit itself does not generate waste but may be used with samples that are hazardous. Please use appropriate PPE and ensure disposal in accordance with local regulations and practices. This product should not be used in the presence of a flammable atmosphere such as an anaesthetic mixture with air, oxygen, or nitrous oxide.

Introduction, manufacturer's details

These Operating Instructions describe the function and the use of the „Large Animal Organ Perfusion Chamber“ They represent an essential part of the apparatus and must be kept close to the apparatus, accessible to all users. All the information in these Instructions have been assembled after careful examination but it does not represent any warranty of product properties. Alterations in line with technical progress are reserved.

Copyright

This product and the corresponding documentation are protected by copyright. All rights reserved. This document must not be copied, photocopied, reproduced or translated, either as a whole or in parts, without prior written agreement by Hugo Sachs Elektronik—HARVARD APPARATUS GmbH, March-Hugstetten, Germany.

Trademarks

PLUGSYS is a registered trademark of Hugo Sachs Elektronik - HARVARD APPARATUS GmbH, March-Hugstetten, Germany. Other trademarks referred to in these Operating Instructions are the property of the corresponding applicants.

Read these Operating Instructions!

We recommend that these Operating Instructions should be read carefully; they must be observed in full. We accept no liability for any damage caused by inappropriate operation.

Safety notes

- Never use flammable or explosive liquids or gases, fire hazard!
- Any combustible material in the presence of Carbogen (95% oxygen) represents a fire hazard,
- Toxic substances: Where toxic substances (gases, test substances, cleaning agents) are being used, it is essential to conform to the appropriate handling directions in order to prevent any health hazard to the user. Toxic substances must be disposed of in accordance with the appropriate regulations.
- Protect mains-operated electrical equipment against liquids!
- Electrical equipment must be set up and operated in accordance with their Operating Instructions. Special care must be taken in positioning it so that no liquid can pass into it. Never store any liquid (e.g. perfusate) above such equipment.
- Avoid operating the equipment with wet hands. Electrical contacts and perfusion solutions may get corroded and damaged. In addition the equipment will not remain looking good and presentable for a longer time. Who likes the appearance of a salt-encrusted or dirty instrument.

Application

This Perfusion chamber is intended for use in physiological or pharmacological research laboratories for the perfusion of animal organs, e.g. pig kidney or liver segments with any perfusion solution, e.g. saline solutions, cell containing solutions or blood.

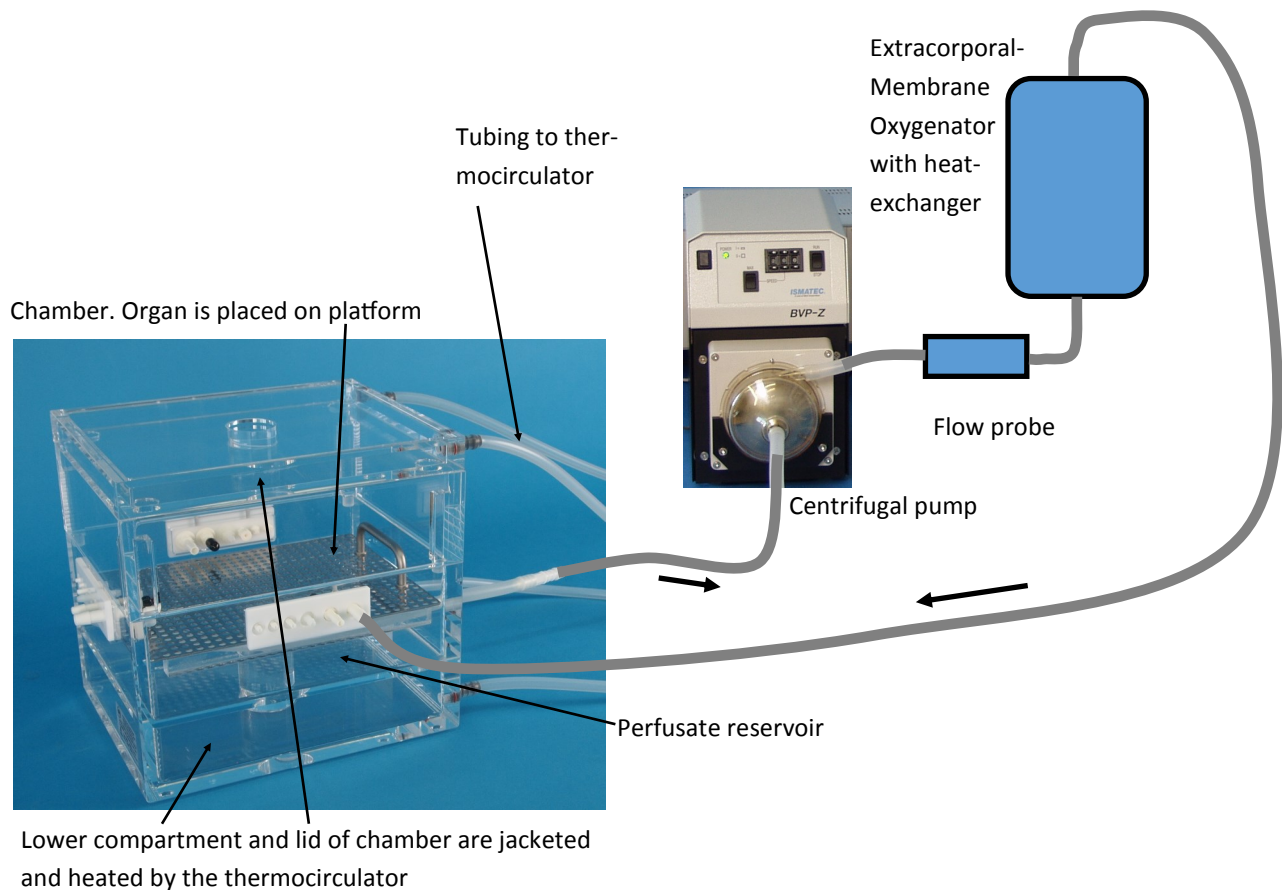


Fig. 1 Example setup with Centrifugal Pump and ExtraCorporal Membrane Oxygenator. Not displayed are the pressure measurement and the pressure control units for the centrifugal pump.

Description of function, summary

The organ to be perfused is placed in the thermostated moist chamber and can be perfused with the perfusion medium under constant-flow or constant pressure conditions. A peristaltic pump or better a centrifugal pump with a gentle action on blood is employed to reduce haemolysis. It can be controlled by an electronic controller (SCP-Module) so that the perfusion can be operated under constant-pressure conditions (or alternatively under constant-flow conditions). The flow can be measured by using a flow probe (6 or 8N) and a Transit Time Flowmeter Module (TTFM-2). For all these modules a PLUGSYS housing will be required. The pressure should also be measured to monitor the experiments results. This requires a pressure transducer (APT300 or P75) and a Transducer Amplifier Module (TAM). A suitable extracorporeal membrane oxygenator (ECMO) with a build in heat eachenger is employed for oxygenating and warming the perfusion solution (blood). It can be of a type used in human medicine. Unfortunatley we can't provide these items as the are used for human clinical application and are not available for us.

In order to perform a large organ perfusion additional components are required:

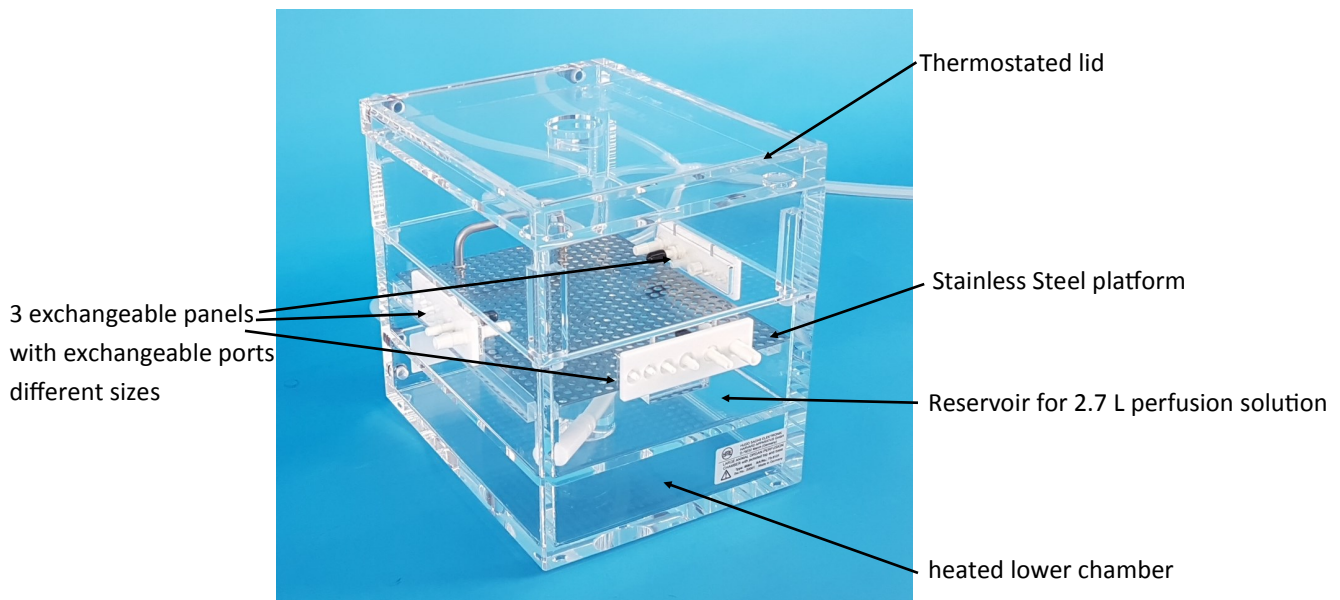
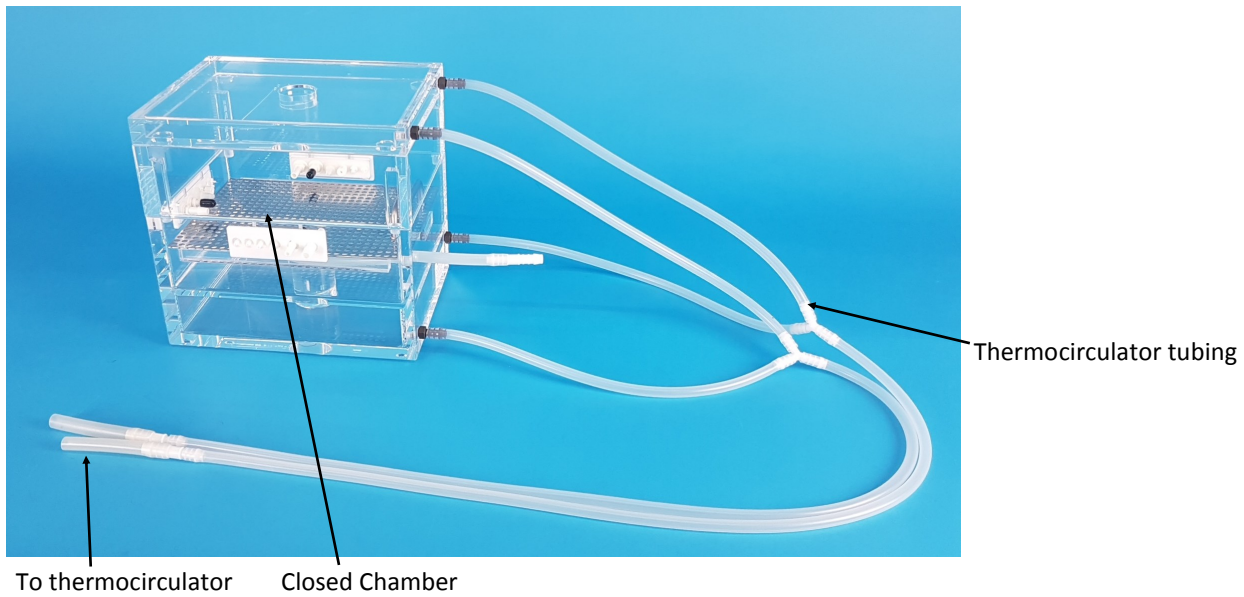
The following items are required for operating the Large Animal Organ Perfusion Chamber:

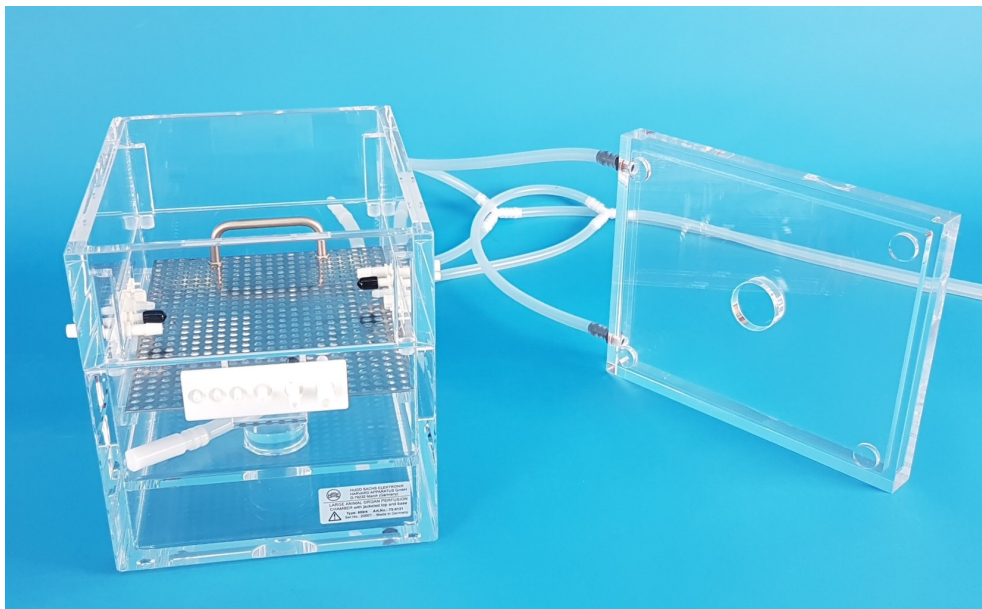
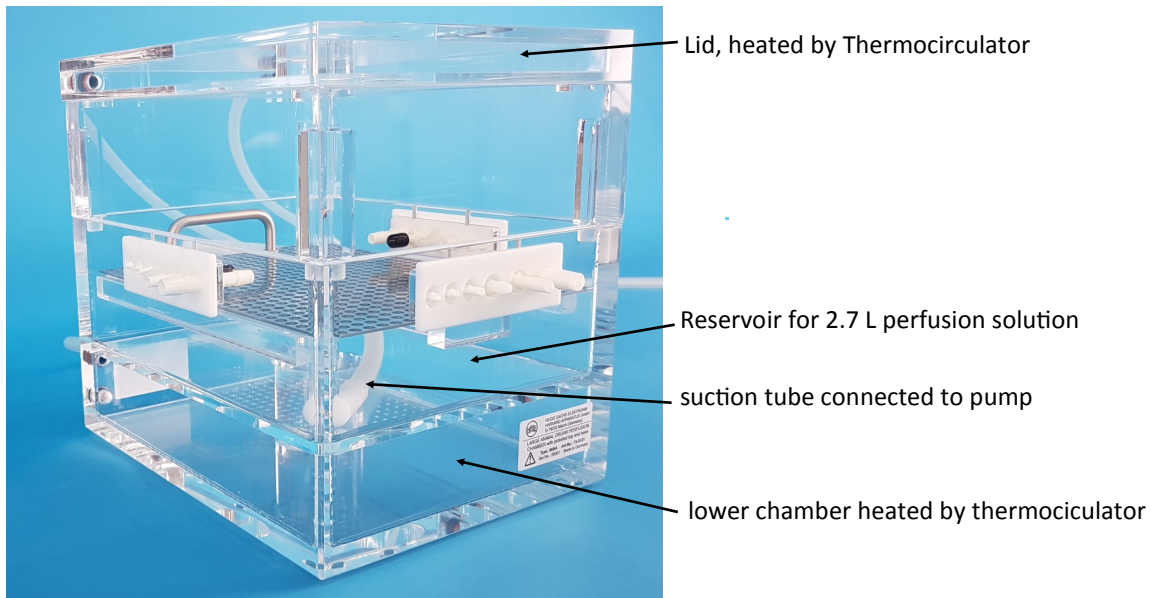
- Thermocirculator with larger heating capacity and a 3 or 5 liter Reservoir
- Several liters distilled water and an anti-algal agent, e.g. Thermoclean DC
- Pump with electrical control. For blood we recommend a Pump Drive BVP-ZX with centrifugal pump head
For saline not cell containing solutions a peristaltic pump can also be used
- PLUGSYS housing for amplifier modules
- Pressure transducer (APT300) and suitable Transducer Amplifier Module (e.g. TAM-D)
- Servo Controller for Perfusion (SCP-Module) Type 704
- Flowmeter Module (TTFM-2) with flow probe Type 6 or 8N
- Extracorporeal Membrane Oxygenator with integrated heat exchanger
- Gas mixing unit, gas blender or 2 – 3 gas flowmeters to mix gases
- Source of gas O₂, Carbogen, N₂, CO₂ for aeration. Central supply or cylinder with pressure regulator and valve
- Depending on the study in the proposed experiment the measurement of additional parameters may be useful. The necessary measuring equipment can be added to system

Options, additional measurements:

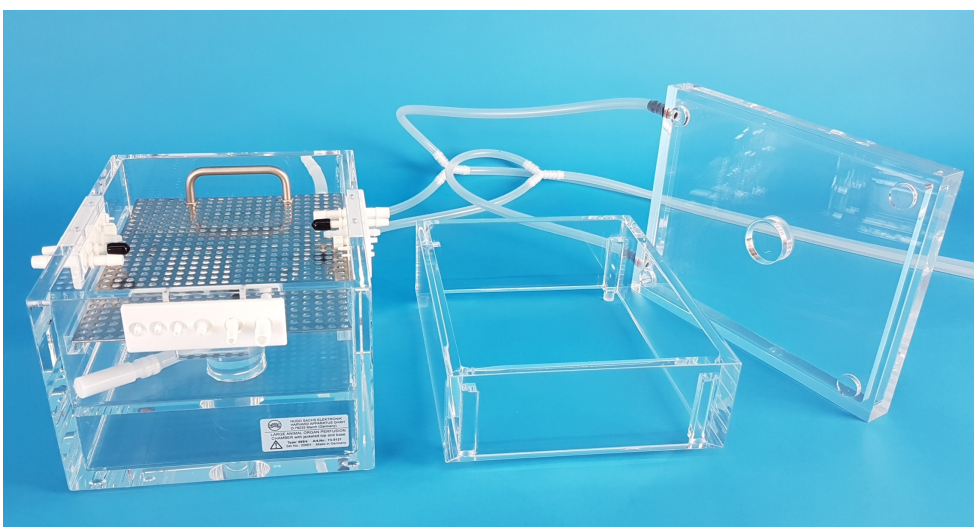
- Continuous blood gas measurements pH, pO₂ , pCO₂ ...
- Drug/substance addition by syringe pumps
- ...

On the following pages we will show several photos of the chamber.

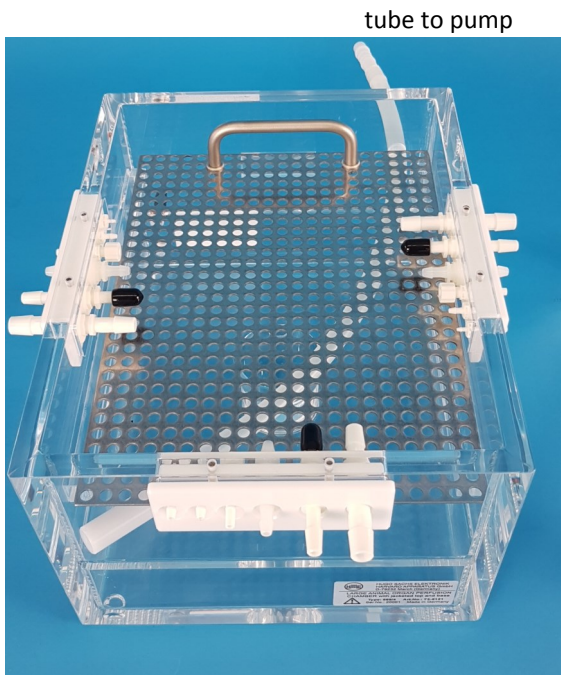




Chamber with removed lid



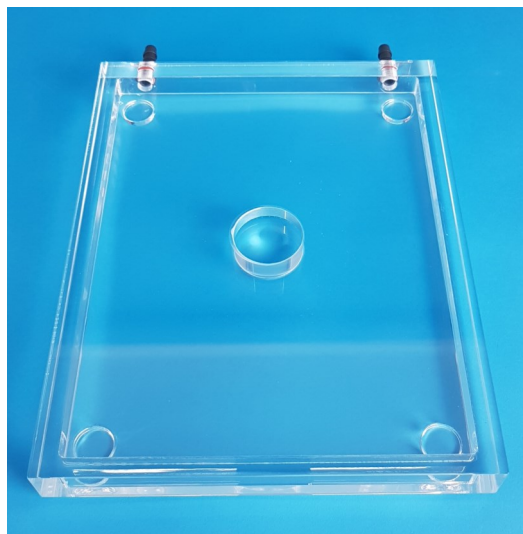
Chamber with removed frame and lid allows easy access to the organ on the platform



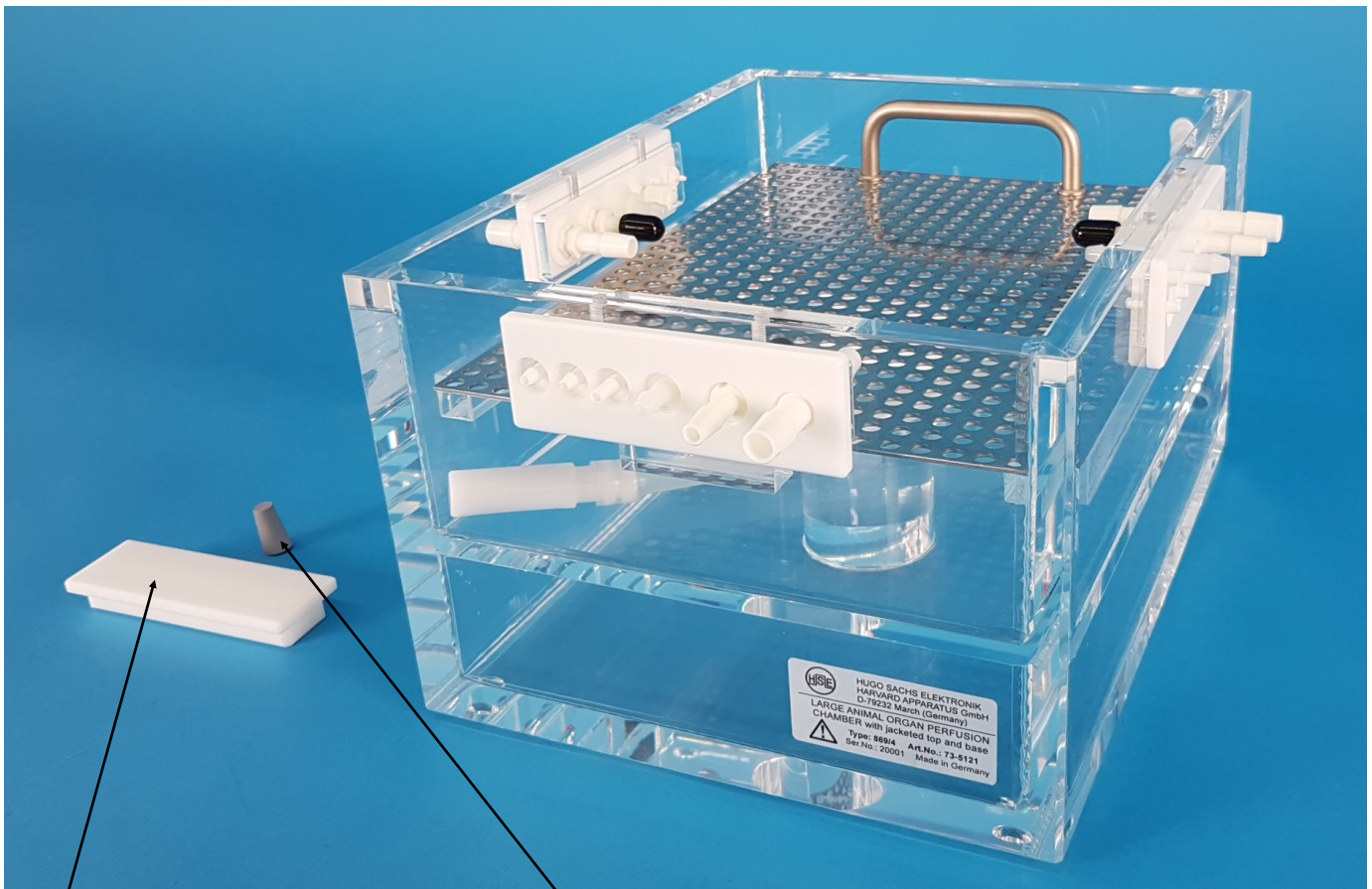
Chamber with stainless steel platform and the 3 panels with exchangeable ports



Frame

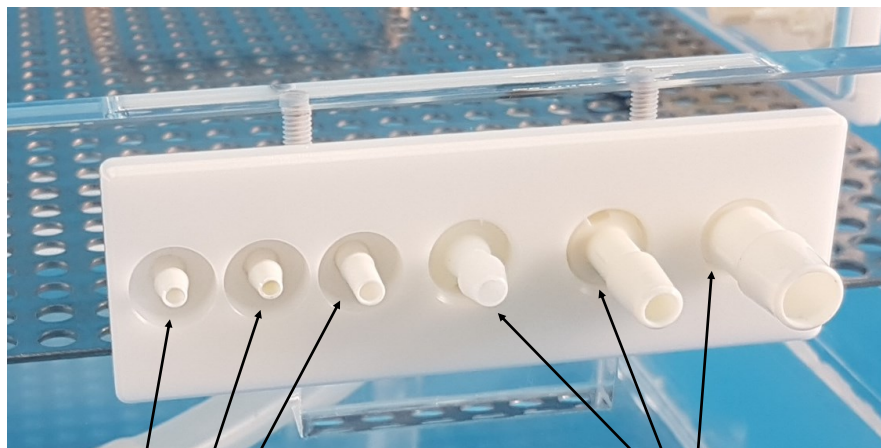


Lid



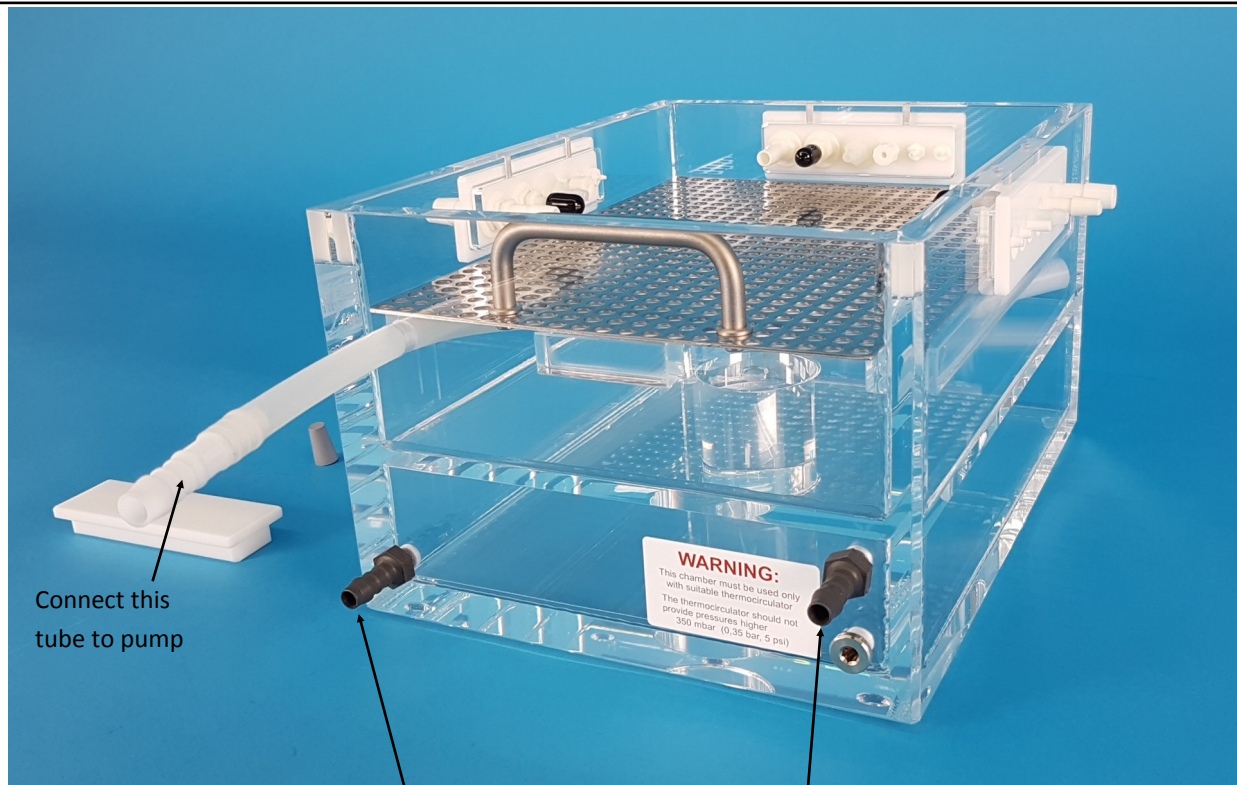
Spare panel without bores, can be modified by customer for special needs.

Rubber stopper



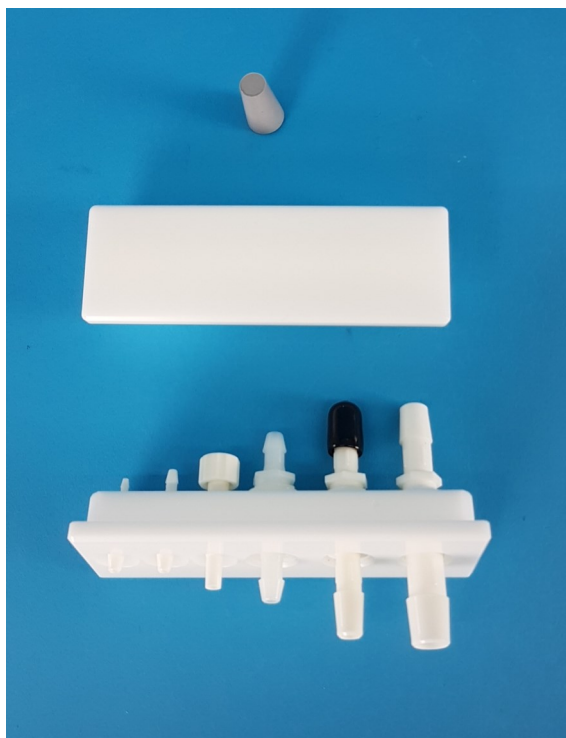
These bores have 1/4-28 UNF threads

These bores have 1/4-18 NPSM thread



Inlet from Thermocirculator.
Read red warning label, do not use a
thermocirculator which provides higher
pressure than 350mbar (5psi)

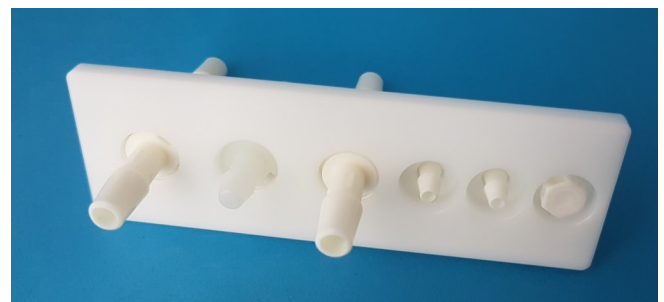
Return to thermocirculator



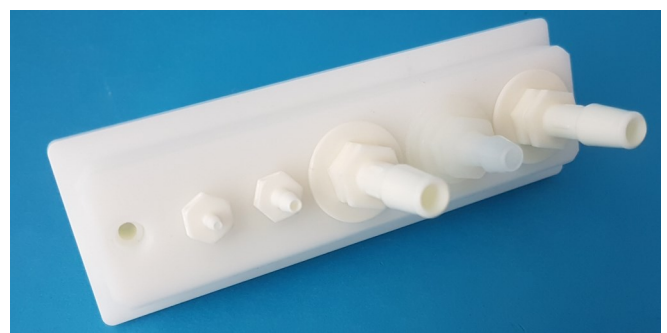
Rubber stopper

Blank panel

Panel with differnt LUER-tube and tube–tube connectors



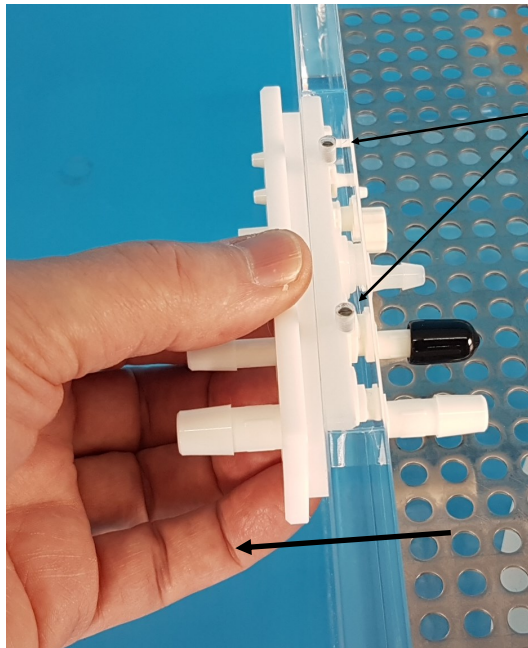
Panel out side



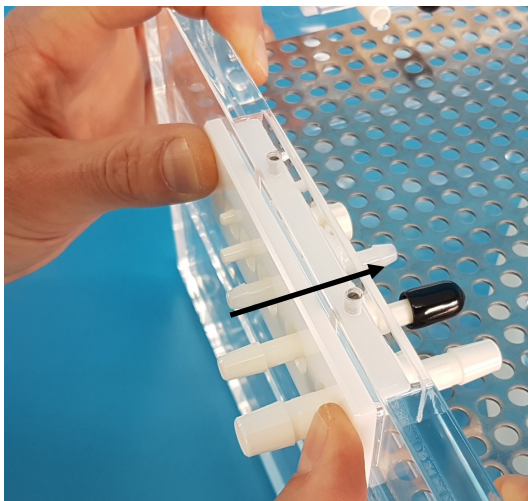
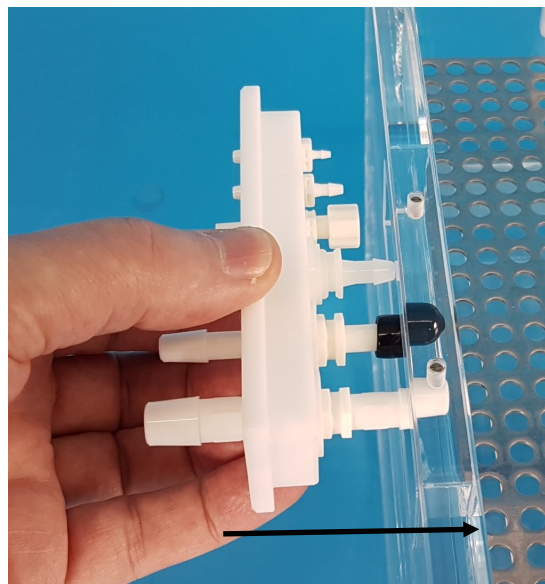
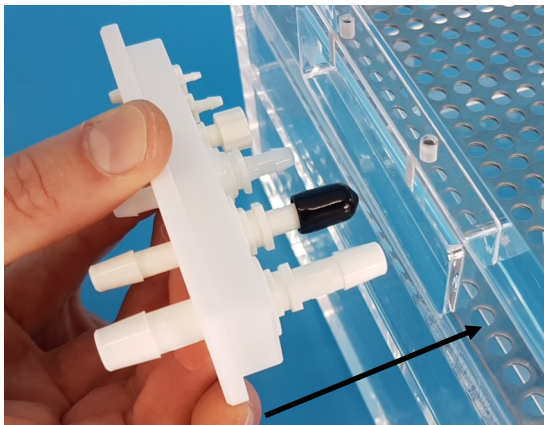
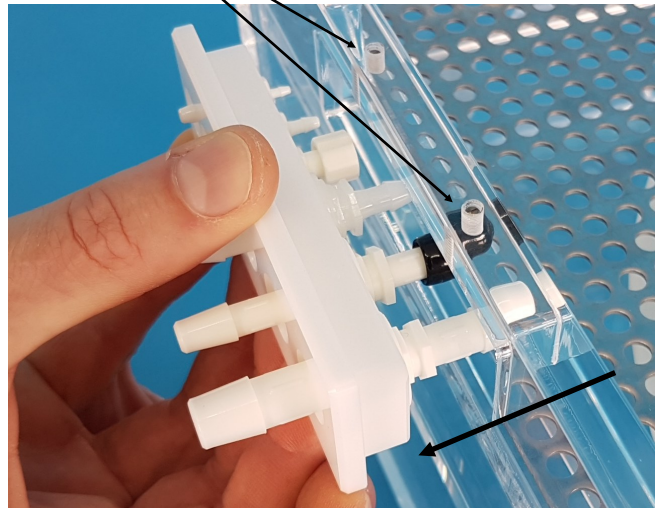
Panel inner side

Removing and exchanging the tube connection panels

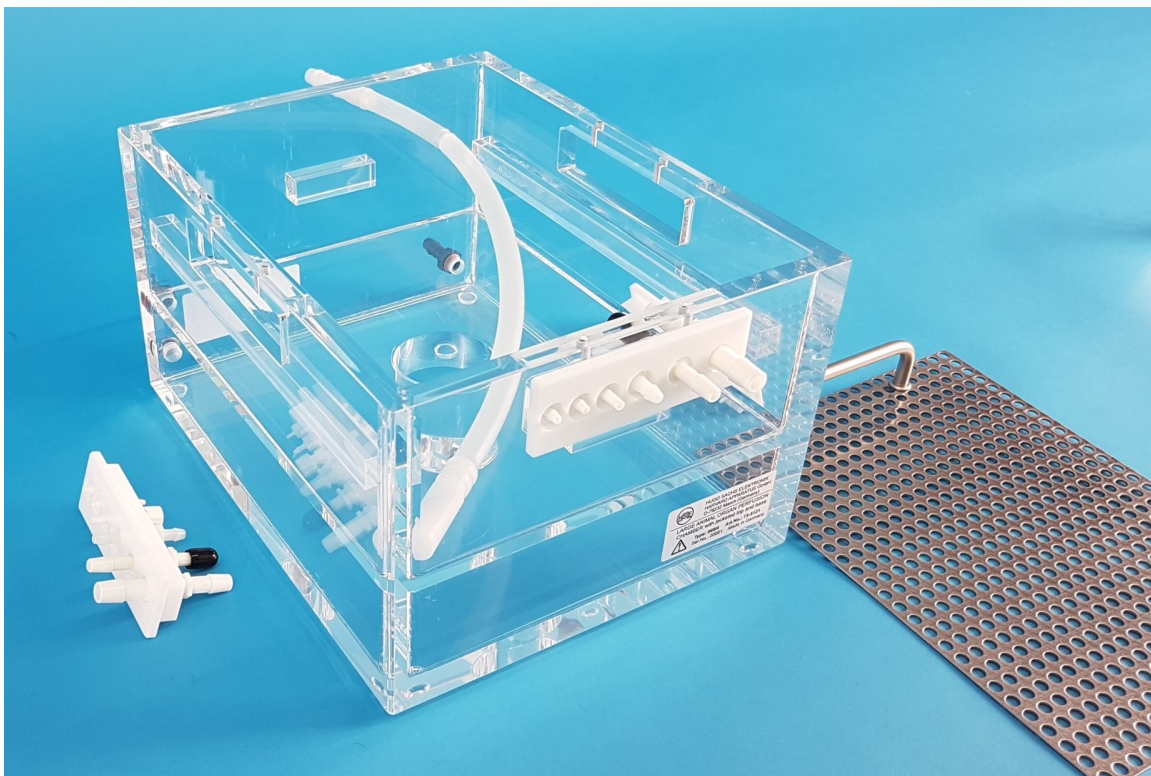
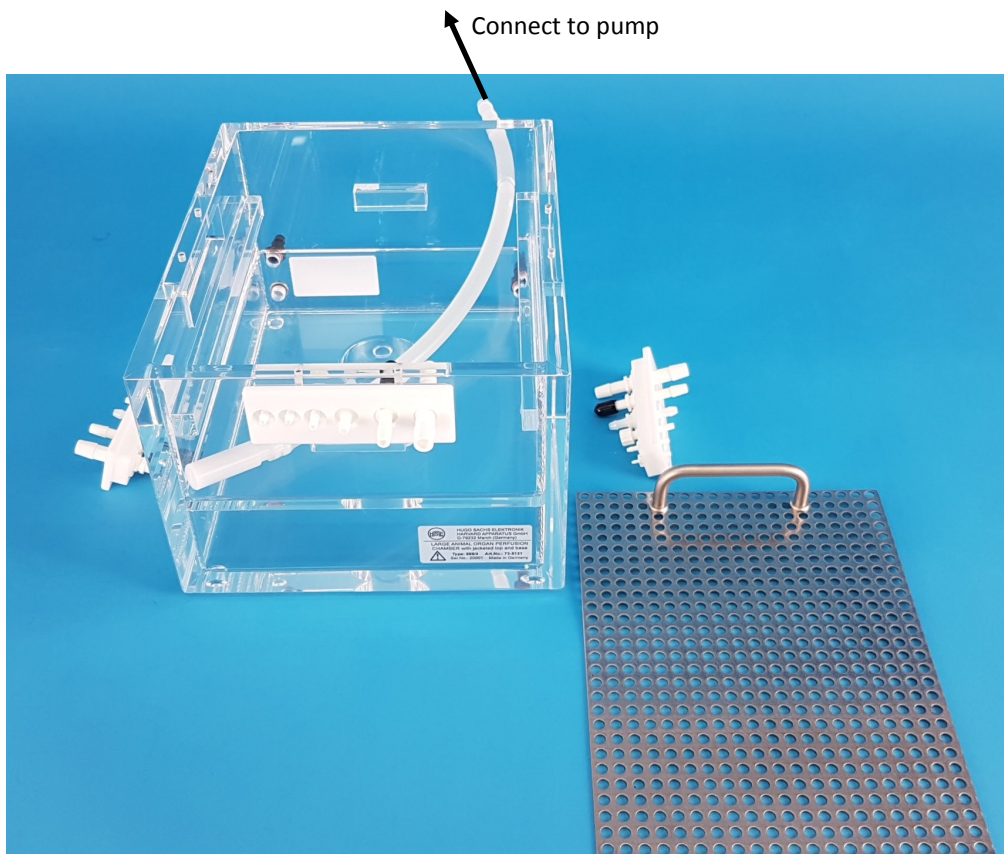
The panels have a click'n go function and can be removed from the chamber easily. Two spring loaded balls fix the panel in the square opening.



Two spring loaded balls press on the panel to fix it in position

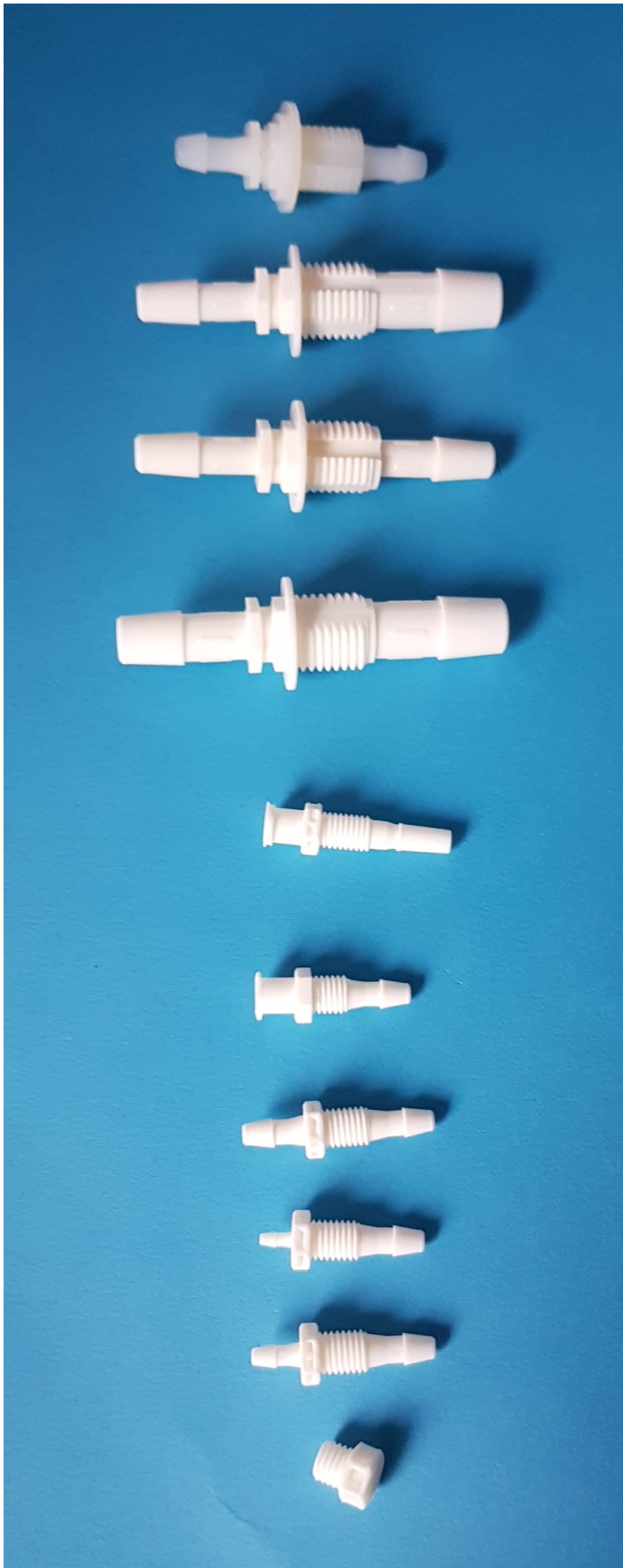


Chamber with removed stainless steel platform and removed left and right panel



Adapters and fittings for exchangeable panels

for 73-5121 LARGE ANIMAL ORGAN PERFUSION CHAMBER with JACKETET TOP + BASE



S16288 Bulkhead 1/4-18 NPSM thread, Straight Adapter for 3/16" ID x 3/16" ID tubing, white nylon, 3/16" = 4,76mm

S16286 Bulkhead 1/4-18 NPSM thread, Straight Adapter for 3/8" ID x 1/4" ID tubing, white nylon, 3/8" = 9,52mm, 1/4" = 6,35mm

S16285 Bulkhead 1/4-18 NPSM thread, Straight Adapter for 1/4" ID x 1/4" ID tubing, white nylon, 1/4" = 6,35mm

S16287 Bulkhead 1/4-18 NPSM thread, Straight Adapter for 3/8 ID" x 5/16" ID tubing, white nylon 3/8" = 9.52mm, 5/16" = 7.9mm

S16289 Female to Male Luer Panel Mount Connector with 1/4"-28 UNF

S16290 Female Luer to 1/8" (3.2mm) ID tubing, Tube Panel Mount Connector

S16281 Panel mount connector, both sides for 1/8" (3.2mm) ID tubing, with 1/4-28 UNF thread

S16282 conn, 1/8" ID tubing to 1/16" ID tubing, with 1/4-28 UNF thread, 1/8" = 3.18mm, 1/16" = 1.5mm

S16283 connector 1/8" ID tubing to 3/32" ID tubing, with 1/4-28 UNF thread, 1/8" = 3.18mm, 3/32" = 2.4mm

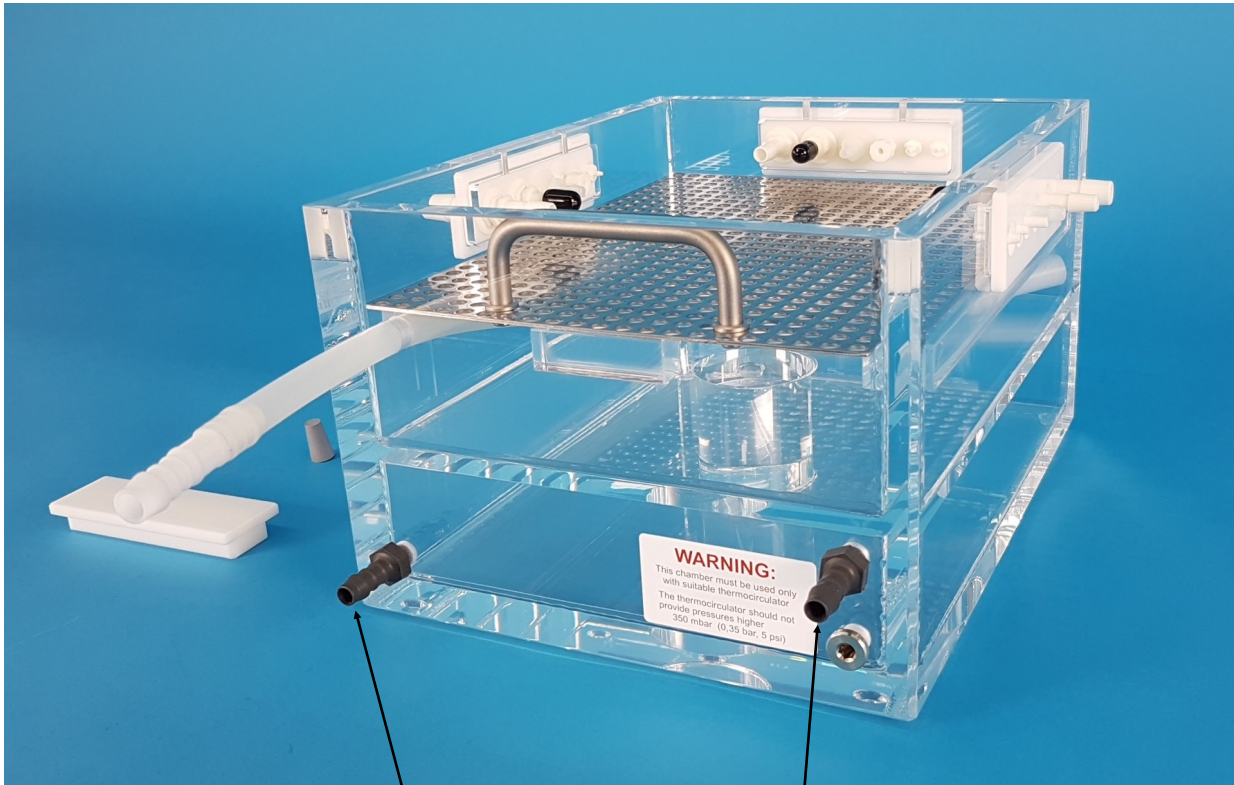
S16284 Stopper
1/4-28UNF with 5/16Hex

Filling the thermostatic circuit

Before starting operation it is necessary to fill the complete thermostatic circuit free from air bubbles.

Connect the thermostatic circulator to the chamber.

Always connect the output of the thermocirculator (see arrows on output ports) to the lower port and the return tube to the upper port. This avoids air bubbles in the thermostatic circuit.



Inlet from Thermocirculator.

Return to thermocirculator

Read red warning label, do not use a thermocirculator which provides higher pressure than 350mbar (5psi)

Before starting the thermocirculator check in the manual the delivered pressure range.

Don't use a thermocirculator which provides higher pressure than 350mbar (6psi)

- If the pressure range is ok, fill the thermocirculator with distilled water and start it.
- Set temperature to 38°C
- Always add distilled water until the thermocirculator bath is filled. Air in the circuit and the tubing should be removed automatically. Remove trapped air by lifting the chamber at the side of the outlet.
- Fill the thermocirculator with Thermoclean DC (~ 1ml/Liter aqua dest) to avoid algae growth
- Always check before starting if you have enough distilled water in the thermocirculator
- Also check tubing, none of the tubes should be kinked
- The heating up process may take 20 –25 minutes
- Check all chambers if they are warmed and flushed with warm water.

Notes on start-up and operation

- **Filling the perfusion circuit:**
Before starting operation it is necessary to fill the complete perfusion circuit free from air bubbles. When using a centrifugal pump some additional operation is required. Since such pumps can not produce suction before they are filled, the suction tube and the pump head must first be filled with liquid. Use the delivered tube set with a larger syringe and remove the air to fill the pump head. The pump can then be switched on to fill the other components of the perfusion circuit.
- **Perfusate quantity required:**
The perfusate level must under all operating conditions be at least 1 cm above the suction tube in the reservoir of the chamber below the organ platform. At higher perfusion flow rates (>1 L/min) the level may have to be higher.

NOTE: the centrifugal pump immediately ceases to operate when larger amounts of air are drawn in!

Maintenance and cleaning of the apparatus

Never use alcohol, alcohol containing liquids or liquids which may attack Plexiglass for cleaning the chamber !!!
Don't use sprays or wet towels containing unknown cleaning fluids !!!

Daily maintenance

The daily effort involved in cleaning the apparatus depends largely on the perfusate being used and on the substances being tested. If the substances do not adhere strongly to the surfaces, cleaning can be limited to thoroughly flushing with distilled water all the parts in contact with the perfusate. Flush the apparatus first with ordinary tap water to remove any remaining perfusate and then flush with adequate quantities of distilled water. If this is not sufficient, a cleaning solution such as „RBS 50“ or „Mucosol“ or „CIDEX OPA“ should be employed.

Weekly cleaning

You should make it a regular rule to clean the apparatus thoroughly with the aid of a cleaning solution before each weekend. All parts in contact with the perfusate have to be flushed thoroughly with the cleaning solution (MUCASOL or CIDEX OPA). It is advisable to let the apparatus stand over the weekend filled with cleaning solution. Before starting experimental work again the solution has to be removed and the apparatus must be flushed thoroughly with distilled water several times.

Maintenance of thermostatic circuit

Maintenance of the thermostatic circuit is limited to replacing the liquid immediately when algae are seen to grow in the circuit. If the blue color of the Thermoclean DC is fading you can add a few more Thermoclean DC. In any case it is recommended to replace the thermostating liquid at least every 12 months. Any leakage in the thermostatic circuit should be dealt with immediately. The liquid level may fall in the course of time through evaporation; you should therefore check from time to time whether the distilled water has to be topped up.

Recommended cleaning agents:

As cleaning solution we recommend **RBS-35** (supplied by Roth) or **Mucosal** or **Cidex OPA**.

These solutions have been tested carefully and are supplied in concentrated form and have to be diluted with water in accordance with the manufacturer's instructions.

WARNING: Use only the cleaning agents recommended!

IMPORTANT:

not all cleaning agents used in the laboratory are suitable for cleaning components made from Perspex, PMMA, Plexiglass. For example, Mucocit F produced by Merz (Frankfurt) attacks Plexiglass. In order to avoid damage to the apparatus you must use only the cleaning agents recommended by the manufacturer. If for any special reasons you require a different cleaning agent you must before using it carry out a compatibility test with the components of the apparatus. Note here the compatibility list for Plexiglass as shown in the appendix. In case of doubt contact the manufacturer of the apparatus.

Suppliers:

MUCASOL

Manufacturer: BRAND <https://www.brand.de>
<https://www.brand.de/en/company/sales-worldwide>

Sigma-Aldrich
Fisher Scientific
VWR
Schülke

CIDEX® OPA

Manufacturer: Johnson & Johnson MEDICAL GmbH
<http://www.fourdirectionsmedical.com/cidex-opa-solution.shtml>
<http://www.vitalitymedical.com/cidex.html>
<https://shop.intermed.de/Hygiene-Desinfektion/Instrumentenhygiene/Instrumentendesinfektion/Cidex-OPA-Instrumentendesinfektion-1x3780-ml.html>
<https://www.medical-praxisbedarf.de/Desinfektion-und-Reinigung/Instrumentenreiniger-und-Desinfektion/Instrumentendesinfektion-Cidex-OPA::2281.html>

Cleaning solution for Glassware: RBS 50 or RBS 35

Manufacturer: Carl Roth GmbH & Co KG

<https://www.carlroth.com/de/de/sonstige-reinigungsmittel-spezialreiniger/labor-reinigungsmittel-rbs-35/p/9238.1>
https://www.sigmaaldrich.com/catalog/product/sial/83461?lang=de®ion=DE&gclid=CjwKCAiA7939BRBMEiwAhX5J3lgxFF0GG29oXBFYZbw-c1btBj849lYymmMnj319Kk062a_EmslBoCJ1MQAvD_BwE
<https://www.thermofisher.com/order/catalog/product/27950#/27950>

Water additives for the thermostatic circuit

In order to suppress algal growth inside the thermostatic circuit we recommend adding the following products to the distilled water:

Thermoclean DC

Manufacturer: Bioanalytic GmbH

Waldmatten 10...13D-79224 Umkirch, Germany

Phone: (+49) (0)7665 5971

Fax: (+49) (0)7665 5683

Email : safety@bioanalytic.de

<http://www.bioanalytic.de>

<http://www.bioanalytic.de/sales.en.html>

Never use alcohol containing water additives !!!

Technical data:

73-5121

LARGE ANIMAL ORGAN PERFUSION CHAMBER, JACKETET TOP and BASE, integrated 2.7L perfusate reservoir, including 3 exchangeable Panel Access Ports

The chamber consists of a jacketed Perspex box and a jacketed cover.

Outer dimensions: 268 x 224 x 284 mm

Material: PMMA

The box is divided in two compartments by a platform receiving the organ.

The lower compartment below the platform is the reservoir for the perfusion fluid.

Inner Dimensions: 200 x 260 x 52mm = 2.7 L

The upper compartment receives the organ.

Inner Dimensions between platform and lid: 200 x 260 x 118mm

Do not use thermocirculators which provide higher pressures than 350mbar (5psi)

Reply form

Please take a few minutes of your time in order to write to us on any difficulties in understanding these Operating Instructions or in the use of the apparatus. With your feedback you help to improve our products and the system documentation and make them more user-friendly.

Please tell us

- where you have found mistakes
- where the arrangement was not clear and what you did not understand
- and where you would like to see improvements

Many thanks for your kind assistance.

Yours Hugo Sachs Elektronik - HARVARD APPARATUS GmbH.

Your name _____

Organisation _____

Street _____

Town _____

Phone / Fax _____

email _____

Please send this sheet or a copy to the adress in the footer.

Chemical Behavior of PLEXIGLAS®

The data given refer to a test temperature of 23 °C and presuppose stressfree installation.

The behavior of the material in practice depends largely on the temperature in use. In case of doubt, we advise you to consult us as to the chemical resistance for particular applications.

The results obtained for all products, especially the branded ones, refer to the production batch tested in each case.

The symbols signify:

- + resistant
- not resistant
- o limited resistance

Antistatics :

- + HB 155
- + Antistatic fluid and cleaning agent

Technical baths :

- + Electroplating baths
- + Photochemical baths

Chemicals, solvents, etc.**a) General**

- Acetic acid, concentrated
- o Acetic acid, up to 25 %
- Acetone
- + Alum
- + Aluminium chloride
- + Aluminium oxalate
- + Aluminium sulphate
- Ammonia water
- + Ammonium sulphate
- Amyl acetate
- Aniline
- + Arsenic
- + Arsenic acid

- + Battery acid
- Benzaldehyde
- + Benzine, pure
- Bromine
- 1-Butanol
- Butyl lactate
- + Butyric acid, up to 5 %

- + Calcium chloride
- + Calcium hypochlorite
- Carbon disulfide
- Carbon tetrachloride
- Chlorinated hydrocarbons
- Chlorine, liquid
- o Chlorine water
- Chloroethyl ether
- Chlorophenol
- o Chromic acid
- + Citric acid, up to 20 %
- + Copper sulphate
- Cresol
- + Cyclohexane

- Diacetone alcohol
- o Diamyl phthalate
- Dibutyl phthalate
- + Diethylene glycol
- Dioxane

- Ether
- Ethyl acetate
- Ethanol, concentrated
- o Ethanol, up to 30 %
- Ethyl bromide
- Ethyl butyrate
- Ethylene bromide

- + Ferric chloride
- + Ferrous chloride
- + Ferrous sulphate
- + Formic acid, up to 2 %
- o Formic acid, up to 40 %

- + Glycerol
- + Glycol

- + Heptane
- + Hexane
- + Hydrochloric acid
- + Hydrofluoric acid, up to 20 %
- + Hydrogen peroxide, up to 30 %

- + Iodine, metallic
- + Lactic acid, up to 20 %

- + Magnesium chloride
- + Magnesium sulphate
- + Manganese sulphate
- + Mercury
- Methanol, concentrated
- o Methanol, up to 30 %
- Methyl ethyl ketone
- Methylated spirits
- + Milk of lime
- + Monobromonaphthalene

- + Nickel sulphate
- + Nitric acid, up to 40 %
- + Nitric acid, over 40 %

- + Oxalic acid

- Perchloroethylene
- + Petroleum
- + Petroleum ether
- Phenols
- + Phosphoric acid, up to 50 %
- Phosphorus trichloride
- Phosphorus, white
- + Picric acid, 1 % in water
- + Potassium bichromate
- + Potassium carbonate
- + Potassium chloride
- + Potassium cyanide

- + Potassium hydroxide solution
- + Potassium nitrate
- + Potassium permanganate
- o 2-Propanol
- + Propylene
- Pyridine

- Silicon tetrachloride
- + Silver nitrate
- + Sodium bisulfite
- + Sodium carbonate
- + Sodium chlorate
- + Sodium chloride
- + Sodium hydroxide solution, 30 %
- + Sodium hypochlorite
- + Sodium sulphate
- + Sodium sulphide
- + Stannous chloride
- + Stearic acid
- + Sulphur
- Sulphur dioxide, liquid
- + Sulfuric acid, up to 30 %
- o Sulphurous acid, conc.
- + Sulphurous acid, up to 5 %
- + Sulfuryl chloride

- + Tartaric acid, up to 50 %
- Thionyl chloride
- Toluene
- + Triethylamine
- Trichloroacetic acid
- + Turpentine
- + Turpentine substitute

- + Urea, up to 20 %

- Xylene

- + Zinc sulphate, aqueous
- + Zinc sulphate, solid

b) Branded products:

- + * CLOPHEN T 55, A60
- o * DEKALIN
- o * FRIGEN A 12(CF₂ CL₂)
- * GLYBAL A
- + * PALATINOL K
- o * PALATINOL O, BB new
- + * SANGAJOL
- + * TERAPIN
- * TETRALIN

Disinfectants**a) General**

- Carbolic acid
- + Chlor. lime paste
- Hydrogen peroxide, up to 40 %
- o Hydrogen peroxide, over 40 %
- Iodine tincture, 5 %
- + Lugol solution
- Methylated spirits
- + Sublimate

b) Branded products

- o * ÄTHROL, up to 5 %
- + * BAKTOLAN, up to 5 %
- * BAKTOLAN, conc.
- + * CHINOGOL, up to 1 %
- * CHLORAMIN, suspension
- + * CHLORAMIN; solution
- + * ELMOCID GAMMA, up to 2 %
- * LYSOFORM
- + * MEFAROL, up to 1 %
- + * MERCKOJOD, up to 1 %
- + * MERFEN
- + * PERHYDROL
- + * PERODIN
- + * SAGROTAN, up to 2 %
- o * SAGROTAN, up to 5 %
- o * VALVANOL, up to 2 %
- + * ZEPHIROL; up to 5 %

Fats, oils, waxes :

- + Animal
- + Mineral
- o Silicone oil
- + Vegetable

Gases and vapours

- + Ammonia
- o Bromine vapours, dry
- + Carbon dioxide
- + Carbon monoxide
- + City gas
- o Chlorine vapours, dry
- + Exhaust gases containing HCl
- + Exhaust gases containing HF
- + Exhaust gases containing H₂SO₄
- + Hydrogen sulphide
- + Methane
- + Nitrogen dioxide
- + Nitrogen monoxide
- + Oxygen
- + Ozone
- + Sulphur dioxide, dry

Beverages, etc.

- + Beer, Wine
- + Camomile extract
- + Chocolate
- + Fruit juice, milk, coffee
- o Spirits, up to 30 %
- + Vinegar
- + Water, mineral water

Cosmetics, etc.

- Camphor
- + * DIPLONA -hair oil
- + Face tonic
- + Glycerine
- + Hair setting lotion (PRIMAWELL)
- Nail varnishes
- Nail varnish removers
- + Ointments
- + Peat water
- + * POLYCOLOR
- + Seawater
- + Soaps
- o Sprays

Plastics

- + Foam plastics
- Foam plastics, plasticised
- + Polyamide
- + Polyethylene
- + PVC
- PVC, plasticised
- + Rubber
- Rubber, plasticised

Foods and spices

- + Aniseed, bay leaf, nutmeg
- Cloves
- + Common salt
- + Honey, pure
- + Ice cream
- + Meat, fish
- + Pepper, cinnamon, onions
- + Pickles

Cleaning agent**a) General**

- Acids, see under chemicals
- Alcohol, concentrated
- o Alcohol, up to 30 %
- Alkalis, see under chemicals
- + Ammonia solution
- Benzine, mixture, containing aromatics
- + Benzine, non-aromatic
- + Bleach
- Carbon tetrachloride
- Methylated spirits
- Perchloroethylene
- + Petroleum
- + Petroleum ether
- + Soap solution
- + Soda water
- Stain remover
- Trichloroethylene
- + Turpentine
- + Turpentine substitute

b) Branded products

- + * AJAX
- + * Antistastischer KUNSTSTOFF REINIGER und Pfleger
- + * BFK cleanser
- + * BOLIMENT
- + * BÖTTCHERIN
- + * BURMAT
- + * BURNUS
- + * CILLIT-GRÜN
- + * DOR
- + * DOSYL
- + * DOSYLAN
- + * FAKO-Polish
- + * FAKO-Polishing paste
- + * FEWA
- + * FRAPPIN
- + * FÜLLBOX
- + * LAWAPLEX
- + * NULL-NULL
- + * PERSIL
- + * PLEXIKLAR
- + * PRIL
- + * REI
- + * SEIFIX
- * SIDOLIN
- * SPECTROL
- + * SPÜLI
- + * WC-00

c) Cleaning agents for pipes and tanks

- + * CALGONIT D, DA, S
- + * NEOMOSGAN M, M powder
- + * NIROKLAR GR liquid
- + * NIROKLAR GR powder
- + * P 3
- o * P 3 basic cleaner
- + * P 3- dix

Pesticides

- Sprays (applied directly)
- o Sprays (applied in the air)
- o Pesticides in aqueous solutions
- + * NEXION stable spray
- + * RABOND stable spray

Protective coatings (strippable)

- + * DIEGEL liquid film 23922
- + * KOPPERSCHMIDT covering paste
- o * SPRAYLAT

Other substances

- + Urine
- Fuel for petrol engines
- o Fuel for diesel engines