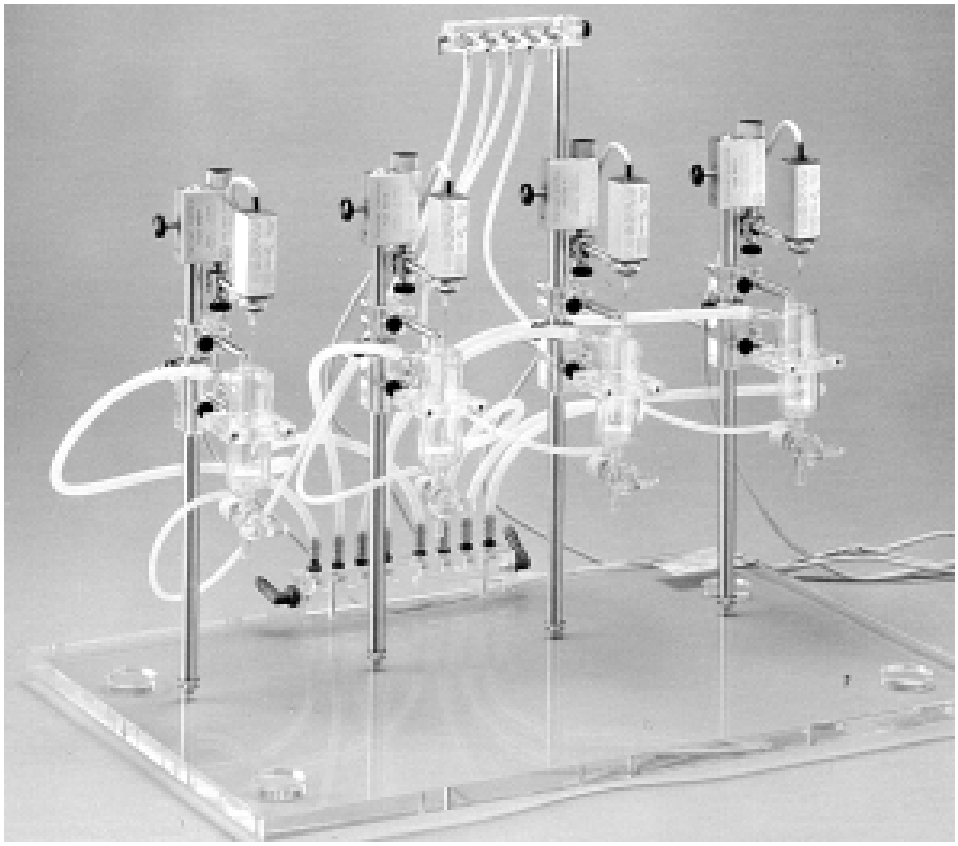
OPERATING INSTRUCTIONS

for the

Model GRAZ

organ bath

Type 846



NOT FOR HUMAN USE

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for the

Model GRAZ organ bath

Type 846

(Version 1.2 / printed: April 2012)

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1. Introduction, manufacturer's details

These Operating Instructions describe the function and the use of the organ bath Type 845. They represent an essential part of the bath and must be kept close to the apparatus.

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.

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1.1 Copyright

1.2 Limitations

These Instructions do not apply to accessory units which are required for operating the apparatus. Any questions arising during operation or installation of such units have to be clarified with the aid of the appropriate Operation Instructions.

It is obviously necessary for thes Instructions to refer to the operation and function of accessory units. This does not imply any replacement of the information contained in the individual Operating Instructions. In particular it is essential that the safety notes in these original Instructions are carefully observed.

2. 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 are incompatible over longer periods. In addition the equipment will remain looking good and presentable for a longer time. Who likes the appearance of a salt-encrusted or dirty front panel!

3. General description

The Graz organ bath consists of a Plexiglass baseplate with 4 vertical columns, each of which carries organ vessel, tissue carrier and transducer for measuring the contraction forces. Organ vessels are available in different sizes of 2, 5, 10 and 20 ml. The organ vessels carry a drain cock for draining the solution. Fresh solution which must be pre-warmed and aerated is introduced into the vessel with a syringe of appropriate size.

A frit is fused into the base of each organ vessel for aerating the solution. A needle valve is provided for separately adjusting the aeration rate of each vessel. The standard tissue carrie is suitable for mounting vascular rings. Other tissue carriers can be supplied in different forms to special order, depending on tissue type and whether electrical stimulation is required.

4. Application

The Graz organ bath is intended for experiments on isolated tissue preparations in fundamental research in physiological and pharmacological laboratories. The standard version is particularly suitable for experiments on vascualr tissues.

5. Additional items required

The following items and equipment are required for work with the organ bath:

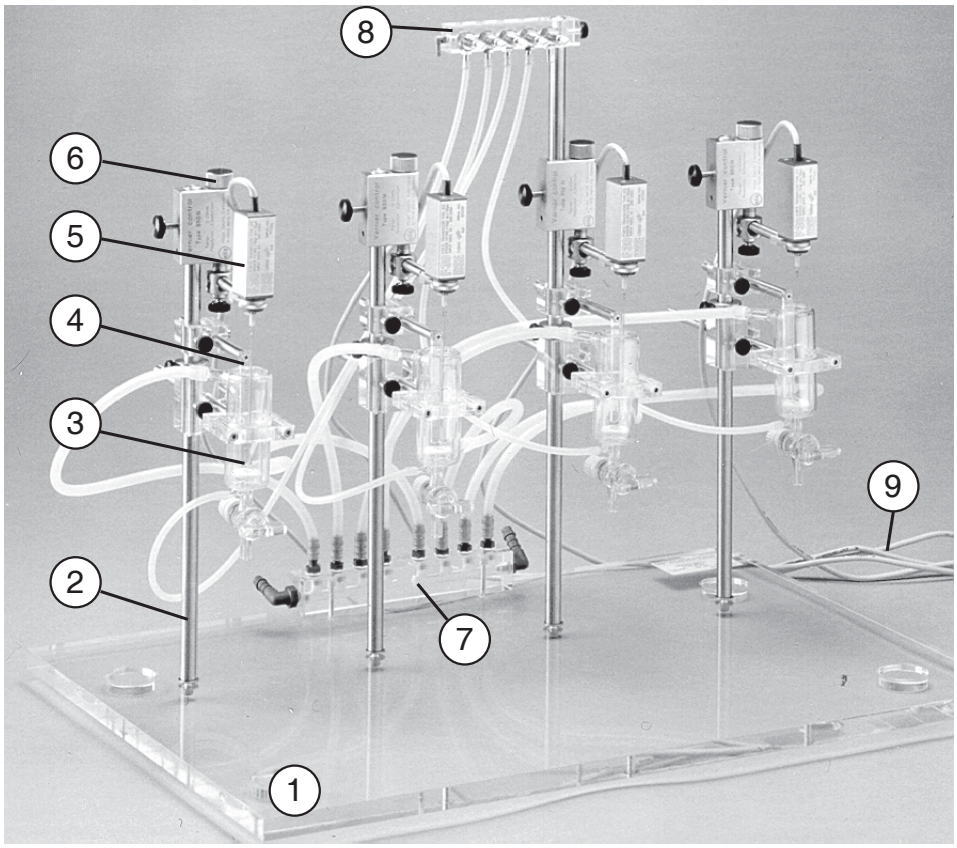
- Circulation thgermostat with approx. 3 litre capacity, distilled water, and algicidal agents such as Thermoklar.
- Carbongen supply for aeration. Either connection to a central supply or Carbogen cylinder with reducing valve. Where additional gas mixtures are tu be used the appropriate connections or cylinders must be available.
- Reservoir for perfusion solution with frit for equilibratin ghte solution supply. The amount of solution required depends on the needs of the intended experiment. The solution reservoir should be placed inside the thermostat bath so that the solution is kept at the correct temperature and tissue contractions through temperature changes during washing are prevented.
- Beaker (4 off) to take the spent solution during washing.
- Transducers (4 off) to measure the muscle contractions (isometric ore isotonic as required) with micrometer height control for fine adjustment of the preload setting. For isometric contraction measurement the use of the HSE force transducer F-30 is recommended.
- A bridge amplifier for each transducer, for signal amplification and adaptation to a recorder or to a computer data capture system.

6. Unpacking, assembly and setting up

Careful packing at the factory largely excludes transport damage. If unexpectedly some damage is visible on the apparatus, the forwarding agent, the postal authorities or the railway must be notified immediately so that the damage can be inspected. Damaged packaging should always be kept.

The organ bath is normally supplied completely assembled. The tissue vesseis as ordered are mounted in position and the tubing is fitted. The water circuit for thermostating must be connected to the connection on the circulation thermostat. In addition the Carbogen supply must be connected up, the transducers have to be fitted in position and connected to the measuring apparatus (bridge amplifier, recorder and/or data acquisition system).

When deciding on the apparatus location the following precautions should be observed. It is a frequent problem that mechanical disturbances (caused by vibration) are overlooked or their effect is underestimated. Im particular, thermostats, recorders incorporating fan motors1 or amplifiers which are being touched in the course of the experiment1 should not be located on the bench on which the apparatus is placed. This appues also to vesseis containing the sample dilutions. Equipment driven by electric motors, such as thermostats, produce mechanical vibrations which excite also the transducer.



Tissue bath 4 x 20 ml

1) Basic Unit (Plexiglass), **2**) Stand column, **3**) Tissue vessel 20 ml, **4**) Tissue holder, **5**) Force transducer F-30, **6**) Vernier control, **7**) Manifold for water circulation, **8**) Gas distribution block with needle valves, **9**) cables of F-30 to the necessary Bridge Amplifiers.

In a recording these disturbances can not be distinguished from electrical hum interference. Care must also be taken not to set up the apparatus dose to other equipment producing vibrations, e.g. centrifuges. The apparatus should not be placed in the direct neighbourhood of a window or a door. Any draught or pronounced heating through direct sunlight may interfere with proper function of the thermostating or the transducers. With very sensitive measurements any draughts may even be transmitted through the connecting thread from tissue to the transducer and simulate faulty contractions.

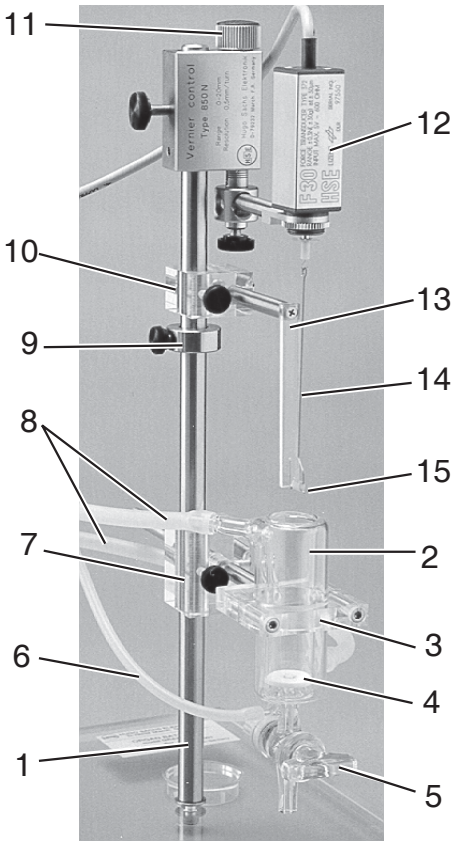
In the measurement of tissue contraction forces (F) where rapidly varying forces have to be determined accurately, especially when the differential coefficient (dF/dt) has to be evaluated, exact experiments are possible only by placing the apparatus on an antivibration table. The table itself is formed by a heavy metal or stone plate which is mounted on antivibration supports.

It is of ten necessary to handle liquids dose to an organ bath Solution is topped up, the apparatus is cleaned etc., so that liquid can be spilled occasionally. It is necessary that amplifiers and recording system are dose at hand but protected from any splashing liquid.

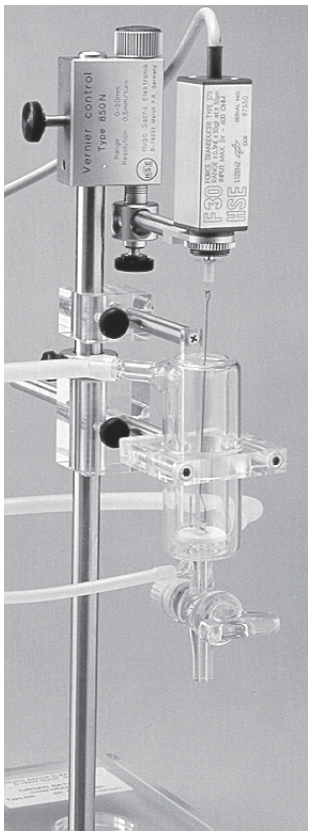
In order to prevent hum interference It 15 important that the apparatus is not set up dose to a mains power supply. Consider also the other side of a wall behind which there may be an electrical control box or even a lift or elevator. It 15 obvious that all the equipment must only be connected to properly installed mains socket outlets with protective earth contact.

Once the apparatus location has been determined, the organ bath is set up on the table or bench or on the HSE subframe and aligned as accurately horizontal as possible.

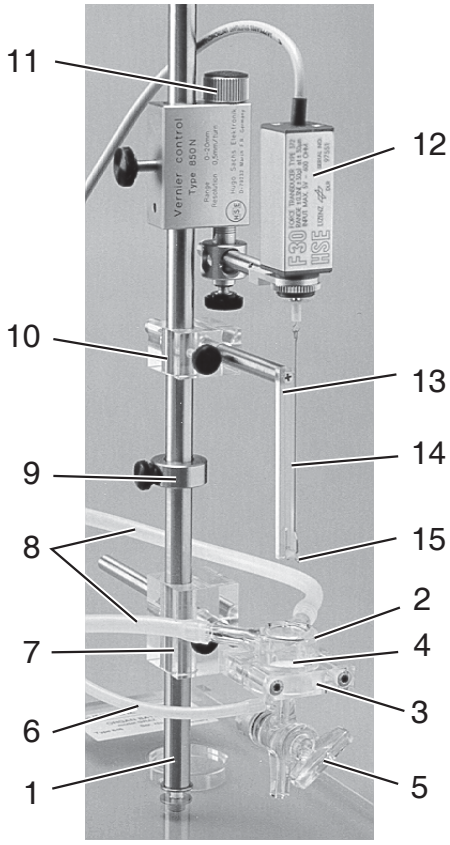
7. Detail views and description



Organ bath (1 channel)
Tissue vessel **(20 ml)** in lower position **(„open“)**.
For explanation of numbers see legend below.



Organ bath (1 channel)
Tissue vessel (20 ml) in working position **(„closed“)**



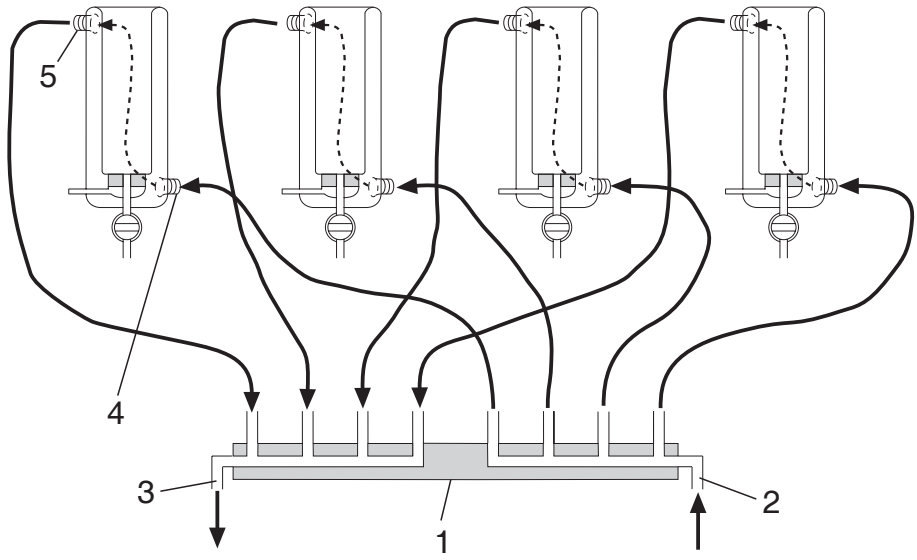
Organ bath (1 channel)
Tissue vessel **(2 ml)** in lower position **(„open“)**.
For explanation of numbers see legend below.

Legend for the illustrations above:

1 Stand column
2 Tissue vessel 20 ml (left and centre illustrations) and 2 ml (right illustration)
3 Holder for tissue vessel
4 Glass frit, fused into the bottom of the tissue vessel
5 Shut-off stopcock for draining the tissue vessel
6 Gas supply tubing for the frit
7 Bosshead for securing the tissue both by the holder (3)
8 Tubing connections for thermostasting the tissue vessel. Note the connections of the indivudal tissue vessels: on the 2 ml vessel the glass connections are fused in at the same level at the top edge of the vessel; on the 20 ml vessel one connection is fused in at the bottom and the other at the top of the vessel. On the 20 ml vessel the connections have to be made so that the thermostating liquid flows through the tissue vessel jacket from the bottom upwards.
9 Stop ring for the bosshead (7). The stop ring has to be so adjusted that the tissue holder (13) just does not touch the Bottom (= frit) of the vessel whehn the tissue vessel is in its working position (centre illustration).
10 Bosshead for the tissue holder (13)
11 Control knob for the micrometer venier control for adjusting the tissue preload.
12 Isometric force transducer F-30
13 Tissue holder
14 Tissue hook with transmission wire to the force transducer
15 Fixed hook for mounting the tissue

8. Connection of the thermostati circuit

The Plexiglass baseplate carries at the centre of the back edge the manifold for the thermostatic circuit. The two connections at the side are intended to be connected to the thermostat (see Operating Instructions for the circulation thermostat). The tubing connections pointing upwards (two groups of four each) are connected to the thermostating connections of the tissue vessels. It is important to ensure that for each vessel one connection is made to the left groups and the other to the right groups. When using larger tissue vessels (above 5 ml) it is important that the flow direction through them is from the bottom upwards. Otherwise air bubbles are not being flushed out of the thermostating jacket by the liquid.



Connection of the thermostating circuit
(1) Manifold, **(2)** Connection for the inflow from the thermostat pump, **(3)** Connection for the return to the thermostat, **(4)** Supply connection to the tissue vessel (bottom!), Connection for the return to the manifold (top!).

8.1 Tubing connections for thermostating

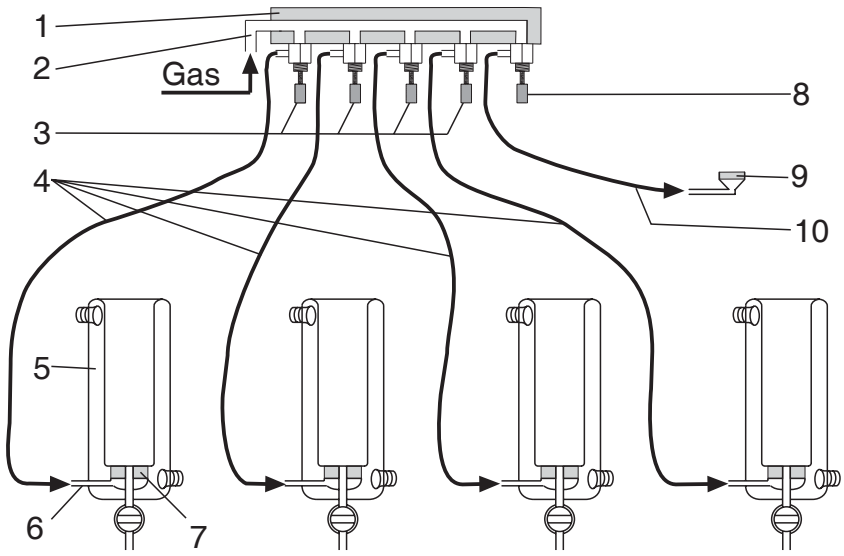
The tubing of the thermostating circuit is completely installed when the equipment is supplied. After the apparatus has been in used for a longer time the tubing, in spite of the use of chemicals which inhibit the growth of algae, becomes contaminated and can no longer be cleaned. In that case you should replace all the thermostating tubing. We recommend the use of Silicone tubing. Where this is not available it is possible to use PVC tubing.

When you replace the tubing, please ensure that the direction of flow through the larger tissue vessels (5 - 10 ml) is from the bottom upwards (see illustration „connection of the thermostatic circuit“). On the smaller tissue vessels (2 ml) the flow direction is not important. Here the connections are at the same level so tzhat it is imnpossible for air pockets to form which have to be flushed out.

9. Connection for aeration

A glass frit is fused into the bpottom of the tissue vessels to ensure equilibration of the perfusion solution (Carbogen is nhormally used for aeration). The gas is fed to the tissue vessels at the glass nipple which protrudes from the side below the frit (diameter 4 mm approx.). A needle valve is provided for each tissue vessel for adjusting the degree of aeration. An additional needle valve serves for adjusting the aeration in the reservoir; a loose glass frit with tubing is supplied for this purpose. The 5 needle valves are combined in the PLexiglass valve block which is mounted with a clamping screw at the top end of the extra-long vertical column. This ensures that the needle valves do not fill with solution when the gas pressure is switched off, thereby preventing corrosion. At the front Plexiglass valve block ofg the angle connection the gas is connected to the gas supply using suitable tubing (Silicone tubingm 3 mm ID, 5 MM OD).

The gas supply can be a central supply system or a gas cylinder. The supply must be provided with a reducing valve which should have an output pressure of about 0.5 bar but must not exceed 1 bar.
Druckminderer versehen sein, dessen Ausgangsdruck bei ca. 0,5 bar liegen sollte, aber 1 bar nicht überschreiten darf.



Connection for aeration

(1) Plexiglass needle valve block, **(2)** Connection for gas supply, **(3)** Needle valves for adjusting the aeration of the tissue vessels, **(4)** Connecting tubing from the side outlet of the needle valves to the gas connections of the tissue vessels, **(5)** tissue vessel (2, 5, 10 or 20 ml), **(6)** Glass connection, **(7)** Glass frit fused into the bottom of the tissue vessel, **(8)** Needle valve for adjusting the aeration in the solution reservoir, **(9)** Glass frit with should glass connection for aerating the solution reservoir, with connecting tubing **(10)**.

WARNING: if you are using a high-pressure gas cylinder as gas supply it is essential that you observe the regulation for securing and handling it!

10. Filling the thermostating circuit

After all the tubing connections have been made correctly and the thermostat has been assembled, the next step is to fill the thermostating system. Only distilled water should be used to fill the thermostat tank. You can add one of the following additives in order to prevent or delay the growth of algae:

- sorbic acid 0.1%
- octanol or higher alcohol
- „Thermoklar“
- „RBS 50“
- „Mucasol“

The first step is to fill the thermostat tank (3 litre). The switch on the thermostat. If the tubing connection shave been made correctly the water jackets of the tissue vessels are now filling evenly from the bottom upwards. If this is not the case, check where some tubing has been kinked somewhere.

When the thermiosatati circuit has been filled completely you must add further liquid to the thermostat tank to top it up.

If you find that larger air pockets remain in the vessels, you should tryx to flush them out by brifly lifting one side of the organ bath.Air bubbles in the tubing should be flushed out by tapping and squeezing the tubingf while the circulating pump is running.
Make sure that the thermostatic circuit is switched on early enough so that all parts of the system have

reached the correct temperature at the beginning of the experiment. During the first few days of operation there is a possibility for air bubbles to form in the thermostatic circuit through outgassing of the liquid; these shouuld be removed as described above in order to ensure satisfactory thermostating of the tissue vessels.

NOTE: if the thermostat is not running after it has been switched on, check by means of its Operating Instructions whether it is fitted with a mechanical dry running or overtemperature cutout which may have been operated e.g. through shock during transport.

11. Spares

Tubing for thermostatic circuit

(a) Connection manifold to the tissue vessels:
Silicone tubing 6 mm ID, 9 mm OD
Individual lengths 0.4 to 0.5 m depending on the position of the particular tissue vessel.
Total length 3.5 m approx.

(b) Connection manifold to thermostat
Silicone tubing 7 mm ID, 11 mm OD, 2 off approx. 1 5 m each, total length approx. 3 m

(c) Adapters at the thermostat connectors
2 tubing adapters (from 7 mm to 11 mm, HSE Cat. No. S16173) and
2 short pieces of tubing (appr. 20 cm each), 11 mm ID, 15 mm OD.

Tubing for aeration

(a) Connection needles valves to the tissue vessels:
Silicone tubing 3 mm ID, 5 mm OD
Individual lengths 0.3 to 0.5 m depending on the position of the particular tissue vessel
Total length 1.5 m approx.

(b) Connection needle valve to frit for solution reservoir
Silicone tubing 3 mm ID, 5 mm OD, length 1 to 2 m depending on position of vessel

(c) Connection needle valve block to gas supply:
Silicone tubing 3 mm ID, 5 mm OD, legth according tzo distance to gas supply (2-3 m).

12. Maintenance of the apparatus

12.1 Maintenance and cleaning of the equipment

The daily effort involved in cleaning the apparatus depends largely on the substances being tested. If the substances do not adhere strongly to glass surfaces, cleaning can be limited to simply flushing the tissue vessel with distilled water. If this is not sufficient, a cleaning solution such as **„RBS 50“** or **„Mucasol“** should be employed. When working with stroingly adhering substances it is recommended to remove the glass vessels from the apparatus and to clean them conventionally with chrome-sulphuric acid. The stopcock keys must first be dismantled. The plastic parts of the stopcock (nut and pressure ring) should be kept away from concentrated cleaning agents. On re-assembly the stopcock keys have to be lubricated (for assembly and lubrication see below).

You should make it a regular rule to clean the apparatus thoroughly with the aid of a cleaning solution before each weekend. This involves filling and draining the vessels several times (with tissue holder immersed). Finally the cleaning solution should be left in the vessels stand over the weekend. Before starting experimental work again the solution has to be drained out of the vessels and the apparatus flushed thoroughly with distilled water several times.

Maintenance of the thermostatic circuit is limited to replacing the liquid immediately when algae are seen to form in the circuit. In any case the thermostating liquid should be replaced regularly at least every 6 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.

In addition the correct aeration should be monitored. If the gas bubbles are becoking too large it has to be suspected that the particular aeration frit has become partly blocked.

It is important to ensure free movement and sealing of the stopcocks. Wheh necessary the stopcock key has to be removed, cleaned, and re-lubricated with stopcock grease. To remove the key the plastic nut at the back has to be unscrewed. Watch out for the O-ring between the plastic pressure ring and the nut. Apply only a very thin layer of grease to the stopcock key. The bores must of course be kept free from grease. Re-assemble the stopcock in the reverse order. Remember that the plastic nut has only a safety function against the key slipping out; tighten up the nut only very slightly. When the stopcock has been fully assembled the key must turn with a „sucking“ action without any „scratching“.

In principle the stopcock keys are interchangeable. After several hundred operations there is however a possibility that the stopcock become ground in so that they no longer seal perfectly if a key has been placed in a different stopcock body. It is therefore advisable to mark the stopcock keys before cleaning and to fit them always in the same stopcock. If you have to replace a stopcopck keys, e.g. if it is broken, you have for the reason explained above to grind in the key in the stopcock body with grinding powder.

It goes without saying that external contamination through blood or saline solution has to be removed immediately. Use a moist cloth for that purpose. Any contamionation difficult to remove can be attacked with a cleaning agent.
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.

12.2 Cleaning and maintenance agents

As cleaning solution we recommend RBS (supplied by Roth) or Mucasol (available from Merz). These solutions are supplied in concentrated form and have to be diluted with water in accordance with the manufacturer’s instructions.

Use only the recommended cleaning agents!

IMPORTANT: not all cleaning agents used in the laboratory are suitable for cleaning components made from 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 Section 13. In case of doubt contact the manufacturer of the apparatus.

Cleaning agents (compatible with Plexiglass):

RBS 50 or RBS 35
Manufacturer and supplier:

Carl Roth GmbH + Co KG, Chemische Fabrik,
Schoemperlenstr. 1-5, D-76185 Karlsruhe 21, Germany
Phone: (+49) (0)721/5606-0, Fax: (+49) (0)721/5606-49,
e-mail: Carl@t-online.de, Internet: http://www.Carl-Roth.de

MUCASOL
Hersteller: Merz + Co. GmbH & Co. Bereich Dr.Kramer,
Eckenheimer Landstrasse 100-104, D-60318 Frankfurt/Main 1, Germany
Phone: (+49) (0)69/15031, Fax: (+49) (0)69/5962 150, Fax: 414 031

Supplier: Rudolf BRAND GmbH & Co.
P. O. Box 11 55, D-97861 Wertheim, Germany
Phone: (+49) (0)9342/808-0, Fax: (+49) (0)9342/808-236

Supplier **USA**: Brand Tech. Scientific
25 Middlesex Turnpike
Essex, CT 06426-1479
Phone: 860-767 2562

In case of difficulty in obtaining these cleaning agents please contact the manufacturer of the apparatus.

Alternative or additional cleaning agents:

- 3% H_2O_2 solution (3-percent hydrogen peroxide solution).

- 10% acetic acid. A stronger solutions must not be used to avoid damaging the Plexiglass components.

Please note: Never use alcohol for cleaning of instruments made of perspex (plexiglas).

13. 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 production batch tested in each case.

The symbols signity:

+ 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(CF_2 CL_2)
- ® 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.
+ ® CHINOSOL, 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 H_2SO_4
+ 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
+ ® NEOMOSCAN 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

14. Reply Form

Please take a few minutes of your time in order to write to us on any difficulties in understanding the Operating Instructions or in the use of the apparatus. With your feedback you will 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 _____

E-mail _____

Please send this sheet or a copy to:

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