

## GENERAL

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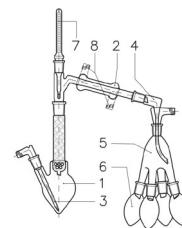
DISTILLATION APPARATUS

### Barchite apparatus

Contents [ml]	Designation	Order no.
25	Micro-barchite apparatus (complete)	GSG 01098
100	Barchite apparatus (complete)	GSG 01097

Scope of delivery:

Part no.	Quantity	Designation	Order no. Version 25 ml	Order no. Version ml
1	1	Boiling flask with melted column	GSG 01098A	GSG 01097A
2	1	Liebig Bridge	GSG 01098B	GSG 01097B
3	1	Boiling capillary	GSG 01098C	GSG 01097C
4	1	Advance	GSG 01098D	GSG 01097D
5	1	Spider template	GSG 01098E	GSG 01097E
6	4	Receiver flask	GSG 01098F	GSG 01097F
7	1	Handle thermometer	GSG 01098G	GSG 01097G
8	4	Threaded hose connection coupling	SAS 00749 01	SAS 00749 01



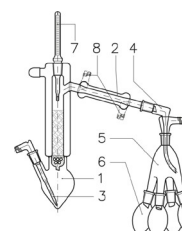
- Transition ground joint is designed as standard ground joint NS 19/26, as with NS 14/23, liquid blockages can easily occur in the piston neck due to excessive vapour velocities

### Barchite apparatus with silver-mirrored insulating jacket

Contents [ml]	Designation	Order no.
100	Barchite apparatus (complete) with mirrored insulating jacket	LSG 01101

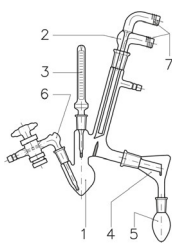
Scope of delivery:

Part No.	Quantity	Designation	Order no. Version 100 ml
1	1	Boiling flask with melted column	LSG 01100
2	1	Liebig Bridge	GSG 01097B
3	1	Boiling capillary	GSG 01097C
4	1	Advance	GSG 01097D
5	1	Spider template	GSG 01097E
6	4	Receiver flask	GSG 01097F
7	1	Handle thermometer	GSG 01097G
8	4	Threaded hose connection coupling	SAS 00749 01



- Transition ground joint is designed as standard ground joint NS 19/26, as with NS 14/23, liquid blockages can easily occur in the piston neck due to excessive vapour velocities

## Micro-micro short-path apparatus



- Fused-in glass cutting edge enables precise adjustment of the removal time
- Vacuum connection with olive D 8
- Boiling capillary with olive D 8 and connection tap 1

Contents [ml]	Designation	Order no.
10	Micro-micro short path distillation apparatus (complete)	SAA 14000

## Scope of delivery:

Part No.	Quantity	Designation	Order no. Version 100 ml
1	1	Micro-micro short-path apparatus	SAA 14001
2	1	Cooling fingers	SAA 14002
3	1	Handle thermometer with NS 10/19 Installation length 50 mm	ALH 09066 04
4	1	Flat spider	SAA 14003
5	3	Receiver flask	KOK 00920 02
6	1	Boiling capillary with connection tap 1 NS	GSG 01053
7	2	Threaded hose connection coupling	SAS 00749 01



## ROTARY PERFORATORS

In addition to distillation and sublimation, crystallisation, filtration and purification by absorption, extraction is an important method for the enrichment, separation and purification of solid and liquid substances. It exploits the different behaviour towards solvents without a chemical reaction taking place. The basic principle of the extraction apparatus presented here is that the solvent is continuously vaporised in a boiling flask, condenses in a reflux condenser and drips onto the extraction material. From there, it returns to the boiling flask loaded with the extract substances. Dissolved substances can also be selectively separated from liquids using suitable solvents. The basic prerequisite for all liquid-liquid extractions is that the substances involved must be

solvents are not or only slightly miscible with each other. Intensive contact between the phases is important, which is only very imperfect with conventional perforators. For this reason, the circulation of the extraction agent through the extraction material must be repeated often, which takes a lot of time. The rotation perforator according to H. Ludwig, on the other hand, is equipped with a rotating distributor inserted into the extraction vessel, which is caused to rotate via a magnetic coupling. The extraction agent fed to this distributor from the cooler from above is propelled by centrifugal force from small holes in a distributor ring, in the form of fine droplets, into the liquid to be extracted and thus causes a fine distribution and intimate mixing of the extraction agent with the extraction material.

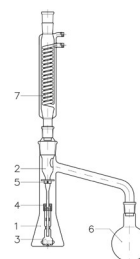
The fact that there is intimate contact between the extraction agent and the material to be extracted for a sufficient period of time means that an optimum exchange of substances is achieved. Due to the rotation of the liquid to be extracted in the extraction vessel, the finely distributed extractant loaded with the extracted substance only reaches the separation zone of the perforator after a longer dwell time in the extraction material and runs back into the distillation flask, from which the solvent is returned to the extraction circuit by renewed evaporation. According to Ludwig, liquid-liquid extractions are carried out with rotary perforators in a much shorter time than with conventional devices.

## Rotary perforator according to Ludwig - 100

Contents [ml]	Designation	Order no.
100	Rotary perforator according to Ludwig (complete)	SAA 02069 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 29/32 and NS 29/32, capacity 100 ml	SAA 02069 01
2	1	Feed or suction pipe with NS 29/32 and NS 29/32 and bearing	SAA 02069 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02069 03
4	1	Slip guard	SAA 02069 04
5	1	Separator ring with retaining ring	SAA 02069 05
6	1	Round bottom flask, capacity 100 ml	KOK 01024 05
7	1	Intensive cooler, 160 mm	GSG 01073 01



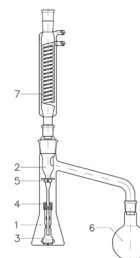
- for liquid-liquid extraction of specific lighter solvents
- Available as standard in six versions: 100 ml, 300 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

## Rotary perforator according to Ludwig - 300 ml -

Contents [ml]	Designation	Order no.
300	Rotary perforator according to Ludwig (complete)	SAA 02070 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 45/40 and NS 29/32, capacity 300 ml	SAA 02070 01
2	1	Feed or suction pipe with NS 45/40 and NS 29/32 and bearing	SAA 02070 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02070 03
4	1	Slip guard	SAA 02070 04
5	1	Separator ring with retaining ring	SAA 02070 05
6	1	Round bottom flask, capacity 500 ml	KOK 01024 07
7	1	Intensive cooler, 250 mm	GSG 01073 02



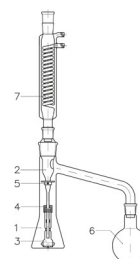
- for liquid-liquid extraction of specific lighter solvents
- Available as standard in six versions: 100 ml, 300 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

## Rotary perforator according to Ludwig - 500 ml -

Contents [ml]	Designation	Order no.
500	Rotary perforator according to Ludwig (complete)	SAA 02071 00

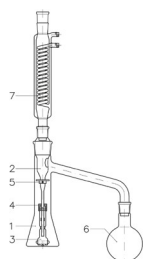
Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 45/40 and NS 29/32, capacity 500 ml	SAA 02071 01
2	1	Feed or suction pipe with NS 45/40 and NS 29/32 and bearing	SAA 02071 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02071 03
4	1	Slip guard	SAA 02071 04
5	1	Separator ring with retaining ring	SAA 02071 05
6	1	Round bottom flask, capacity 500 ml	KOK 01024 07
7	1	Intensive cooler, 250 mm	GSG 01073 02



- for liquid-liquid extraction of specific lighter solvents
- Available as standard in six versions: 100 ml, 300 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

### Rotary perforator according to Ludwig - 1000



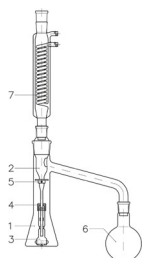
- for liquid-liquid extraction of specific lighter solvents
- Available as standard in six versions: 100 ml, 300 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

Contents [ml]	Designation	Order no.
1000	Rotary perforator according to Ludwig (complete)	SAA 02072 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 45/40 and NS 29/32, capacity 1000 ml	SAA 02072 01
2	1	Feed or suction pipe with NS 45/40 and NS 29/32 and bearing	SAA 02072 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02072 03
4	1	Slip guard	SAA 02072 04
5	1	Separator ring with retaining ring	SAA 02072 05
6	1	Round bottom flask, capacity 1000 ml	KOK 01024 08
7	1	Intensive cooler, 250 mm	GSG 01073 02

### Rotary perforator according to Ludwig - 2000 ml -



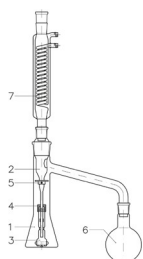
- for liquid-liquid extraction of specific lighter solvents
- Available as standard in six versions: 100 ml, 300 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

Contents [ml]	Designation	Order no.
2000	Rotary perforator according to Ludwig (complete)	SAA 02073 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS60/46 and NS 29/32, capacity 2000 ml	SAA 02073 01
2	1	Feed or suction pipe with NS 60/46 and NS 29/32 and bearing	SAA 02073 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02073 03
4	1	Slip guard	SAA 02073 04
5	1	Separator ring with retaining ring	SAA 02073 05
6	1	Round bottom flask, capacity 2000 ml	KOK 01024 09
7	1	Intensive cooler, 400 mm	GSG 01073 03

### Rotary perforator according to Ludwig - 5000 ml -



- for liquid-liquid extraction of specific lighter solvents
- Available as standard in six versions: 100 ml, 300 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

Contents [ml]	Designation	Order no.
5000	Rotary perforator according to Ludwig (complete)	SAA 02074 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 60/46 and NS 29/32, capacity 5000 ml	SAA 02074 01
2	1	Feed or suction pipe with NS 60/46 and NS 29/32 and bearing	SAA 02074 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02074 03
4	1	Slip guard	SAA 02074 04
5	1	Separator ring with retaining ring	SAA 02074 05
6	1	Round bottom flask, capacity 6000 ml	KOK 01024 11
7	1	Intensive cooler, 400 mm	GSG 01073 03

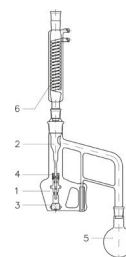


## Rotary perforator according to Ludwig - 150 ml -

Contents [ml]	Designation	Order no.
150	Rotary perforator according to Ludwig (complete)	SAA 02080 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 29/32 and NS 29/32, capacity 150 ml	SAA 02080 01
2	1	Feed or suction pipe with NS 29/32 and NS 29/32 and bearing	SAA 02080 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02080 03
4	1	Slip guard	SAA 02080 04
5	1	Round bottom flask, capacity 250 ml	KOK 01024 06
6	1	Intensive cooler, 250 mm	GSG 01073 02



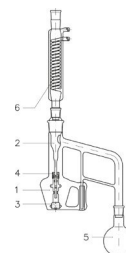
- for liquid-liquid extraction of specifically heavier solvents
- Available in six standard versions: 150 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

## Rotary perforator according to Ludwig - 500 ml -

Contents [ml]	Designation	Order no.
500	Rotary perforator according to Ludwig (complete)	SAA 02081 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 45/40 and NS 29/32, capacity 500 ml	SAA 02081 01
2	1	Feed or suction pipe with NS 45/40 and NS 29/32 and bearing	SAA 02081 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02081 03
4	1	Slip guard	SAA 02081 04
5	1	Round bottom flask, capacity 500 ml	KOK 01024 07
6	1	Intensive cooler, 250 mm	GSG 01073 02



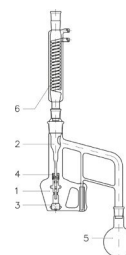
- for liquid-liquid extraction of specifically heavier solvents
- Available in six standard versions: 150 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

## Rotary perforator according to Ludwig - 1000 ml -

Contents [ml]	Designation	Order no.
1000	Rotary perforator according to Ludwig (complete)	SAA 02082 00

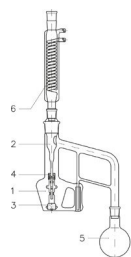
Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 45/40 and NS 29/32, capacity 1000 ml	SAA 02082 01
2	1	Feed or suction pipe with NS 45/40 and NS 29/32 and bearing	SAA 02082 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02082 03
4	1	Slip guard	SAA 02082 04
5	1	Round bottom flask, capacity 1000 ml	KOK 01024 08
6	1	Intensive cooler, 250 mm	GSG 01073 02



- for liquid-liquid extraction of specific heavier solvents
- Available in six standard versions: 150 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

## Rotary perforator according to Ludwig - 2000



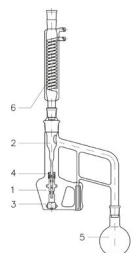
- for liquid-liquid extraction of specifically heavier solvents
- Available in six standard versions: 150 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

Contents [ml]	Designation	Order no.
2000	Rotary perforator according to Ludwig (complete)	SAA 02083 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 60/46 and NS 29/32, capacity 2000 ml	SAA 02083 01
2	1	Feed or suction pipe with NS 60/46 and NS 29/32 and bearing	SAA 02083 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02083 03
4	1	Slip guard	SAA 02083 04
5	1	Round bottom flask, capacity 2000 ml	KOK 01024 09
6	1	Intensive cooler, 400 mm	GSG 01073 03

## Rotary perforator according to Ludwig - 5000 ml -



- for liquid-liquid extraction of specifically heavier solvents
- Available in six standard versions: 150 ml, 500 ml, 1000 ml, 2000 ml, 5000 ml

Contents [ml]	Designation	Order no.
5000	Rotary perforator according to Ludwig (complete)	SAA 02084 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Extraction vessel with NS 60/46 and NS 29/32, capacity 5000 ml	SAA 02084 01
2	1	Feed or suction pipe with NS 60/46 and NS 29/32 and bearing	SAA 02084 02
3	1	Rotary distributor with magnet, pivot nipple and bearing	SAA 02084 03
4	1	Slip guard	SAA 02084 04
5	1	Round bottom flask, capacity 6000 ml	KOK 01024 11
6	1	Intensive cooler, 400 mm	GSG 01073 03



## CHROMATOGRAPHY

Chromatography is an analytical and preparative technique for the separation and purification of organic as well as inorganic and biochemical substances. It can be described as a separation technique of a dissolved substance, which is achieved by a differentiated movement of the dissolved

substances under the influence of a travelling solvent. Transparent glass columns are used as separation columns so that the separation can be better observed. After the glass column has been filled with an adsorbent (e.g. aluminium oxide - $\text{Al}_2\text{O}_3$ -), it is essential for a successful separation that

It is extremely important that the column is filled completely evenly with the flow medium or solvent; air bubbles and uneven filling must be avoided at all costs. It should also be noted that the flow rate is not too high (3 to 4 ml/min for a 40 cm column).

### Chromatography column, basic form 01

Order no.		



- Chromatography columns are available in 3 basic forms
- Basic mould 01: Four punctures to support a glass wool belly
- available with different variables, see page 11.14-11.15

### Chromatography column, basic form 02

Order no.		



- Chromatography columns are available in 3 basic forms
- Basic shape 02: Filter plate, funnel-shaped drain
- available with different variables, see page 11.14-11.15

### Chromatography column, basic form 03

Order no.		



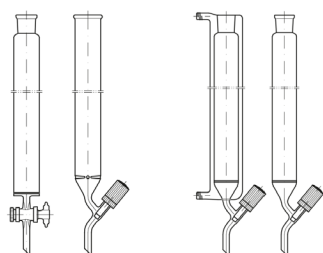
- Chromatography columns are available in 3 basic forms
- Basic shape 03: Filter plate, drain with extremely small dead volume.
- available with different variables, see page 11.14-11.15

## Filter plates

Filter plate porosity	Order no.
D0	Variable 04
D1	Variable 05
D2	Variable 06
D3	Variable 07
D4	Variable 08

- the basic moulds 01, 02, 03 are available with these and other variables

## Different variables



- the basic moulds 01, 02, 03 are available with these and other variables

Designation	Order no.
PTFE spindle valve	Variable 09
Flared edge	Variable 10
Taper ground joint sleeve NS 14/23	Variable 11
Taper ground joint sleeve NS 29/32	Variable 12
Connection standard stopcock	Variable 13
Tempering jacket	Variable 15
Drain bending pipe	Variable 16
Drain capillary tube	Variable 17
Bendable drain pipe with GL 14 glass thread and PTFE compression fitting for attaching fine hoses	Variable 18
Drain with NS core and vacuum connection	Variable 19

## Inner diameter

Inner diameter [mm]	Order no.
10	Variable 21
15	Variable 22
20	Variable 23
25	Variable 24
30	Variable 25
40	Variable 26
50	Variable 27
60	Variable 28

- the basic moulds 01, 02, 03 are available with these and other variables
- other diameters are available on request

## Filling level

Filling height [mm]	Order no.
200	Variable 29
300	Variable 30
400	Variable 31
600	Variable 32
800	Variable 33
1000	Variable 34
1500	Variable 35
2000	Variable 36

- the basic moulds 01, 02, 03 are available with these and other variables
- Other filling heights are available on request

## SIMULTANEOUS WATER MAPPING DISTILLATION

This apparatus is particularly suitable for isolating high-boiling substances with very low water solubility and a high molecular weight in relation to water. Solvents can also be used for the extraction whose specific weight

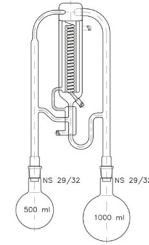
is greater than 1. Before distillation from both flasks begins, the U-tube is filled with water via the filling tube or, if the specific gravity of the organic solvent is greater than 1, with the solvent. The flask, which is connected to the distillation tube

contains the liquid with the specifically higher weight.



## Apparatus for simultaneous water vapour distillation extraction (complete)

Order no.	
	SAA 02043 00



- Apparatus is suitable for isolating highly soluble substances with very low water solubility and a high molecular weight in relation to water
- Solvents with a specific gravity greater than 1 can also be used for extraction

## SOXHLET EXTRACTORS

Soxhlet extractors have a siphon that completely empties the just-filled extraction sleeve at intervals. Partial heating takes place in the extraction section of the usual Soxhlet, which can generally be neglected. If the fractionating extraction

However, if a substance is selectively soluble in the cold, it must be extracted cold. For this case, NORMAG manufactures the Soxhlet cold extractor with cooling jacket. For extractions at elevated temperatures, the Soxhlet hot extractor is used, in which the sleeve is heated by the vapour.

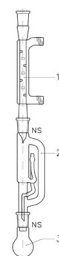
and emptied by the siphon as usual at intervals. The NORMAG appliances are always equipped with intensive coolers, the effectiveness of which offers a high level of operational safety and on the upper section of which drying pipes can be placed.

### Micro-micro Soxhlet extractor (complete)

Contents [ml]	NS	Order no.
5	14/23	GSG 02023 00

Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Special cooler for micro-micro Soxhlet extractor	GSG 02023 01
2	1	Micro-Micro Soxhlet Extractor	GSG 02023 02
3	1	Round bottom flask, 10 ml, NS 14/23	KOK 01020 02



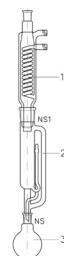
- Please note when selecting pistons for extractors: The nominal capacity of the flask should always correspond to twice the capacity of the extractor

### Micro-Soxhlet extractor (complete)

Contents [ml]	NS	NS 1	Order no.
50	14/23	29/32	GSG 02022 00

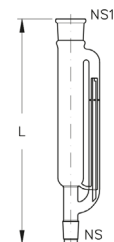
Scope of delivery:

Part No.	Quantity	Designation	Order no.
1	1	Special cooler for micro-Soxhlet extractor	GSG 02022 01
2	1	Micro-Soxhlet extractor	GSG 02022 02
3	1	Round bottom flask, 100 ml, NS 14/23	KOK 01020 05

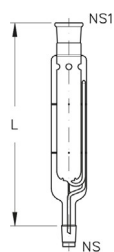


### Soxhlet extractors

Contents [ml]	L	NS	NS 1	Order no.
70	270	29/32	34/45	GSG 02019 17
100	270	29/32	45/40	GSG 02019 18
150	325	29/32	45/40	GSG 02019 19
250	375	29/32	45/40	GSG 02019 20
500	405	29/32	60/46	GSG 02019 22
1000	525	29/32	71/51	GSG 02019 23
2000	490	29/32	100/60	GSG 02019 24

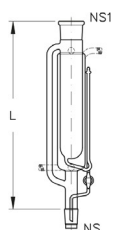


Soxhlet hot extractors



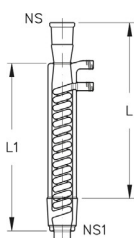
Contents [ml]	L	NS	NS 1	Order no.
100	300	29/32	45/40	<a href="#">GSG 02020 06</a>
150	355	29/32	45/40	<a href="#">GSG 02020 07</a>
250	410	29/32	45/40	<a href="#">GSG 02020 08</a>
500	420	29/32	60/46	<a href="#">GSG 02020 09</a>
1000	540	29/32	71/51	<a href="#">GSG 02020 10</a>

Soxhlet cold extractors



Contents [ml]	L	NS	NS 1	Order no.
100	320	29/32	45/40	<a href="#">LSG 11080 11</a>
150	375	29/32	45/40	<a href="#">LSG 11080 12</a>
250	430	29/32	45/40	<a href="#">LSG 11080 13</a>
500	440	29/32	60/46	<a href="#">LSG 11080 14</a>
1000	560	29/32	71/51	<a href="#">LSG 11080 15</a>

Intensive cooler for Soxhlet extractors



L	L 1	NS	NS 1	Order no.
235	220	29/32	34/35	<a href="#">GSG 02019 09</a>
270	260	29/32	45/40	<a href="#">GSG 02019 10</a>
320	315	29/32	60/46	<a href="#">GSG 02019 12</a>
315	315	29/32	71/51	<a href="#">GSG 02019 13</a>
305	315	29/32	100/60	<a href="#">GSG 02019 14</a>



## SOLVENT CIRCULATION APPARATUS (COMPLETE)

Absolutely anhydrous solvents are used especially in preparative organometallic chemistry. These solvents are first pre-treated with drying agents such as calcium chloride or phosphorus pentoxide in order to bind the majority of the water. For absolutisation, the

The pre-dried solvent is advantageously subjected to reflux via sodium wire or lithium alanate. For safety reasons, the all-glass reflux condenser is replaced by a metal spiral heat exchanger. The metal spiral heat exchanger is inserted into the jacket pipe via a conical ground joint sleeve NS 29/32.

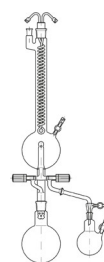
suspended. The metal spiral heat exchanger is supplied in stainless steel. The upper side outlet with NS 14/23 conical ground joint sleeve is used for ventilation and can be fitted with a pressure relief valve or a dry pipe, for example.

## Solvent circulation apparatus (complete) with standard stopcock and PTFE plug

Storage container [ml]	Heat exchanger material Length: 300 mm	Order no.
500	Stainless steel, no. 1.4571	LSG 08806 03
1000	Stainless steel, no. 1.4571	LSG 08806 04

Scope of delivery:

Storage container [ml]	Nitrogen flask capacity [ml]	Round bottom flask Capacity [ml]	Order no.
500	250	-	GSG 01020H 06
1000	500	-	GSG 01020H 07
500	-	1000	GSG 01024 08



- Execution according to Bösherz
- is equipped as standard with standard ground joints NS 29/32 and NS 14/23 as well as PTFE double spindle valve SPV 6, complete with lateral advance with grease-free Rotulex connection and spherical ground joint clamp RS 19/9, metal spiral heat exchanger, cooling water connections: Metal thread GL 14 and 2 threaded hose connections couplings GL 14

## APPARATUS FOR EXTRACTIVE WATER VAPOUR DISTILLATION (COMPLETE)

The apparatus is particularly suitable for accurately determining the content of essential oils in plant parts. The oils obtained from plant parts (buds, flowers, fruits, seeds, leaves, twigs, herbs, bark, wood, roots, tubers, bulbs) are divided into fatty oils and essential oils. Essential oils are complex mixtures of alcohol, aldehydes, ketones, esters, oxides, lactones, sulphur- and nitrogen-containing compounds, terpenes and many others

partly still unexplained compounds. To determine the essential oil content in plant parts, the apparatus for extractive water vapour distillation has proven itself in practice.

proven to be excellent. The essential oil is driven out of the precisely weighed substance placed in the extraction container with water vapour, condensed on the downstream descending cooler and separated from the water in the measuring tube. Essential oils with a density of less than or greater than 1 can be detected exactly. By placing a saturated sodium bromide solution in the measuring tube of the apparatus, the water-soluble components of the distilled essential oil are prevented from dissolving. Water flows back into the boiling flask via the return line, which can be shut off with a glass needle valve, from where it is reintroduced into the extraction process through renewed evaporation.

is switched on. The distillation time is

-Usually about three hours from the start of boiling. The volume of the transferred oil is precisely determined in the measuring tube. The percentage by weight of essential oil is calculated by determining the density of the oil obtained using a Pregl precision weighing pipette, a special pycnometer for determining the density of small volumes.

$$\frac{100 \times \text{determined density} \times \text{oil volume [ml]}}{\text{Extract weight [g]}}$$

= % essential oil

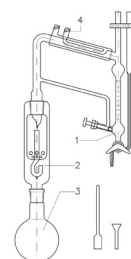


## Apparatus for extractive water vapour distillation (complete)

		Order no.
		SAA 02110 00

Scope of delivery:

Part	Description	Content of the measuring tube [ml]	Order no.
1	Measuring tube	0.8 (melted down for reinforcement)	SAA 02110 01
1	Measuring tube	4	SAA 02110 11
1	Measuring tube	10	SAA 02110 21
2	Extraction sleeve, extraction container	-	SAA 02111 01
3	Round bottom flask, sleeve NS 29/32	-	KOK 01024 07
4	Threaded hose connection coupling GL 14	-	SAS 00749 01



- The yield of essential oil can vary greatly depending on the substance used
- For this reason, devices with different sized measuring tubes (0.8, 4 and 10 ml) are offered
- The measuring tube consists of: Cylindrical ground joint core NS 29/32, Czako standard stopcock with hollow glass plug, bore 3 mm, glass thread GL 14, glass needle valve, graduated measuring tube
- Extraction sleeve/extraction container consists of: conical ground joint sleeve NS 29/32, conical ground joint core NS 29/32, complete with funnel, protective tube and stainless steel wire mesh

## FLUORINE DETERMINATION APPARATUS (COMPLETE)

With this fluorine determination apparatus, a quick determination of fluorine is possible in a short time of about one hour. After filling the sample vial

(7) with the finely ground sample is doused with a mixture of silicic acid and phosphoric acid (not too much to avoid over-foaming). The horizontal evaporator (1) filled with water with the waa-

The vertical heating rod ensures very even boiling and a steady, continuous flow of vapour, which is brought to approx. 250°C in the vapour superheater (4) on the vertical heating rod. At this high temperature, the volume of liquid in the sample flask (7) always remains the same and it does not need to be heated in particular. During distillation, the horizontal heating rod must always be supplied with sufficient heat.

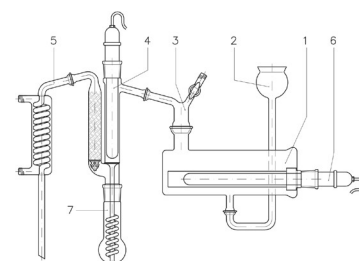
The vapour temperature and the associated distillation speed thus remain largely constant. The vapour temperature and the associated distillation speed thus remain largely constant. The SiF<sub>4</sub> (silicon fluoride) formed escapes via the coil cooler and can be titrated with thiocyanate according to Volhard.

## Fluorine determination apparatus (complete)

		Order no.
		SAA 09299

Scope of delivery:

Part no.	Quantity	Designation
1	1	Vaporiser, Normag model, with sleeve NS 29/32, KS 35 and KS 18
2	1	Refill funnel with KS 18
3	1	Connecting piece with KS 35, KS 18 and standardised vapour drain tap 3 NS
4	1	Steam superheater with sleeve/core NS 29/32 and 2 KS 18, complete with Raschig rings
5	1	Snake cooler with KS 18
6	2	Quartz immersion heater, coupled, complete with series switch for 220 volt alternating current
7	1	Test bulb with sleeve NS 29/32, complete with glass spiral
	3	Spherical ground joint clamp for KS 18



- Supplied with tripod and brackets