LAB Online Exhibition

Operation Manual

knowledge

Action movie

www.1788lab.com E-mail:info@1788lab.com

Table of contents

Read through these operating instructions thoroughly before you use the **BÜCHI** Hydrolysis Unit **B-411**.

Keep these instructions in the immediate area of the apparatus so that they can be referred to at any time. Chapter 2 contains important safety tips. Knowledge of these is indispensable for the safe operation of the apparatus.

en, Version C (20 pages)	**Order no.**
B-411 Instructions	**96685**

1 Scope of delivery

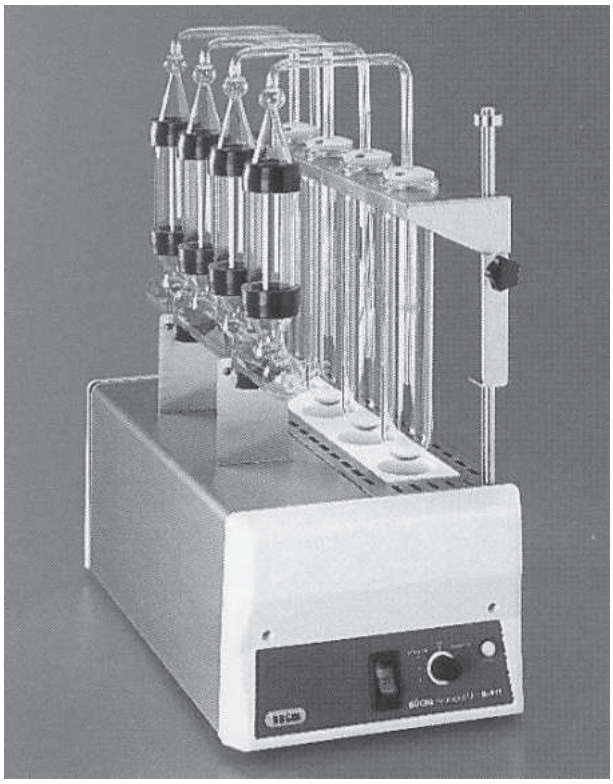

Figure 1: Hydrolysis Unit B-411

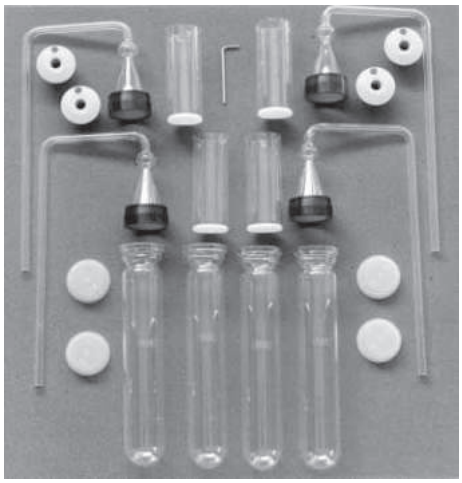

Figure 2a: Enclosed parts

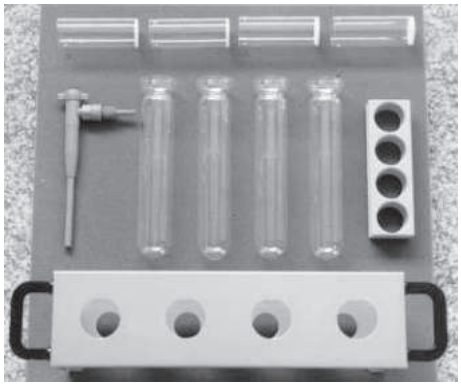

Figure 2b: Optional accessories

Description

Models:	**Order no.**
B-411 Hydrolysis Unit 230 V 50/60Hz	**37455**
B-411 Hydrolysis Unit 120 V 50/60Hz	**37456**

Table 1: Scope of delivery

Enclosed parts:	
1 Set of 4 digestion vessels 300 ml	**37377**
1 Set of 4 glass sample tubes (frits)	**37281**
4 Sample aspiration tube	**37380**
1 Set of 4 caps for digestion vessel	**37463**
1 Set of 4 stoppers Ø 45	**37725**
1 Inbus wrench 3.0 mm	**00610**
1 Bottle of 2.5 kg Quartz sand (0.3 - 0.9 mm)	**37689**

Mains cable PNE, 1.5m	
Type CH	**10010**
Type Schuko	**10016**
Type GB	**17835**
Type USA	**10020**
Type AUS	**17836**

1 Instructions	
German	**96684**
English	**96685**
French	**96686**
Italian	**96687**
Spanish	**96688**

Optional accessories:	
1 Packaging cpl.	**36055**
1 Holder for 4 digestion vessels	**02013**
1 Frit rack	**37462**
1 Set of 4 glass sample tubes (frits)	**37281**
1 Set of 4 digestion vessels	**37377**
1 Water jet pump, plastic	**02913**
Vacuum hose Ø 6 x 16	**17622**
1 Bottle of 2.5 kg Quartz sand (0.3 - 0.9 mm)	**37689**

Tabelle 2: Optional accessories

2 Safety

The apparatus is constructed in accordance with state-of-the art technology and recognized technical safety regulations. Nevertheless risks and danger can arise from the apparatus:

- if the apparatus is not used according to instructions.
- if the apparatus is operated by insufficiently trained personnel.

2.1 Symbols

Stop
Information on the dangers which can lead to great damage to property or to severe or life-threatening injuries.

Warning
Information on the dangers which can lead to damage to one's health or to damage to property.

Please note
Information which indicates technical requirements. Non-compliance can lead to disturbance, uneconomical operation or production losses.

2.2 Demands on the operator

The apparatus may only be used by laboratory personnel and other persons who on account of training or professional experience have an overview of the dangers which can develop when operating the apparatus.
Personnel without this training or persons who are currently being trained require careful instruction. The present operating instructions serve as the basis for this.

2.3 Regulation use

The apparatus is conceived and built as a piece of laboratory equipment. Its regulation use is the hydrolization of products for fat determination with the use of diluted hydrochloric acid.

2.4 Nonregulation use

Any and every use other than the above-mentioned as well as any and every application which does not correspond to the technical data is a misapplication. The operator bears the sole risk for any possible damage traced back to such a use.

In particular, the following uses are improper:
- Use of the apparatus in rooms which require explosion-proof apparatus.
- Determination of samples which can explode or ignite themselves through impact, friction, heat or sparking (Example: explosives, etc.).

2.5 Fundamental dangers

Fundamental dangers arise from
- hot acids
- damaged glassware
- too small of a distance between the apparatus and the wall (see Chapter 4.1, Set-up location)
- burns caused by contact with hot glass parts.

The removal of covers with the aid of a commercially available tool is - except for authorized maintenance personnel - forbidden. The apparatus is not to be operated with damaged glassware.

Danger to life by contact with voltage carrying parts!

2.6 Safety measures

The wearing of personal protective equipment such as safety glasses, gloves and laboratory coats is necessary. These operating instructions must, as a component of the Hydrolysis Unit B-411 be available at all times to the operating personnel at the place of use of the apparatus.

This is also true for the additional language versions of these instructions which can be ordered separately.

Modifications

Modifications of the apparatus or to the replacement parts or accessories as well as the use of replacement parts or accessories other than those mentioned in these operating instructions is only allowed with the written permission of BÜCHI Labortechnik AG.

Responsibility of the operator

The operator is responsible for the instruction of his or her personnel. For this purpose these operating instructions may be ordered in other languages.
The operator is to inform the manufacturer immediately about all safety related incidents which take place during operation of the apparatus.

3 Function

For Weibull - Stoldt fat determination in food and animal feed, the product must be hydrolyzed to make the fat accessible for extraction.
In this way a reproducible fat determination is possible.

The hydrolysis also frees fat-like substances which are mechanically surrounded by different constituents (carbohydrates and protein substances in undamaged cells or starch membranes) to analysis.

- This is also true for colloid-disperse fractions (protein) which, as a result of surface forces, coat the fat drops (milk, cream, cheese).
- and for certain fat fractions which are bound, chemically or adsorptively, to other components (phosphatide-protein complexes in yeast, eggs, group germs, etc.).

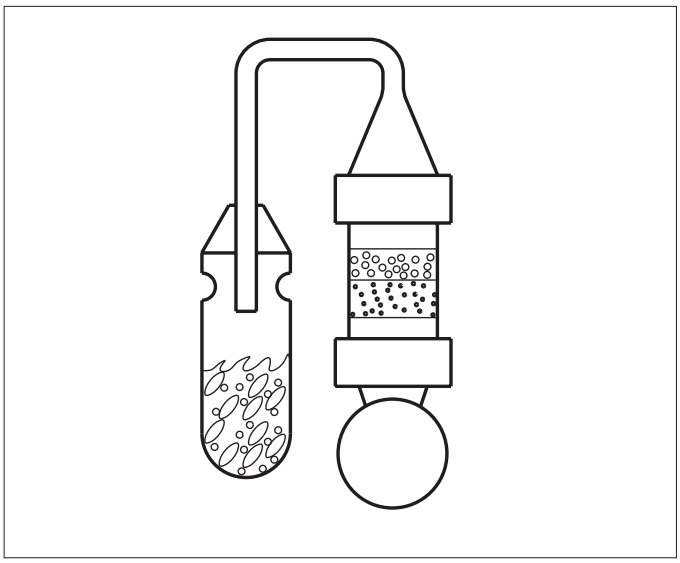

Figure 4: Boil position

3.1 Principle of hydrolysis

The sample is boiled in diluted hydrochloric acid to break down proteins and high-molecular carbohydrates into acid-soluble constituents.

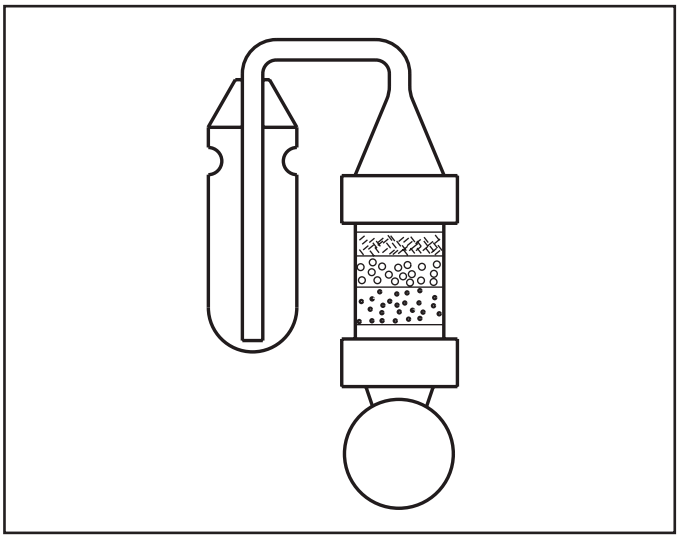

Figure 5: Filter position

Following this, the sample is filtered over a prepared glass frit and dried. The Celite distributes the hydrolysate evenly in the frit, prevents clumping and facilitates the extraction which follows.

The fat can now be extracted with an appropriate solvent.

3.2 Sample weight

The sample weight depends on the fat content of the sample. It should be so chosen that the endweight is between 0.5 and 1.5 g fat.

4 Putting into operation

Pay attention to any damage while unpacking. It is important that any possible shipping damage is recognized while unpacking. If necessary an immediate report on the facts of the matter is to be made (report to postal service, railroad or shipping agency).
The original packing material should be saved for possible later shipping.

4.1 Set-up location

The apparatus must be set up on a stable, clean and level base.
In order to avoid heat damage the distance between the back side of the apparatus and the wall or to another object must be at least 30 cm. There should be no containers, chemicals or other devices located behind the apparatus.

4.2 Electrical connections

Check whether the voltage of the socket outlet is the same as the voltage given on the apparatus plate. The apparatus is always to be connected to an earthed socket outlet. External couplings and extension cords must have a protective earthed conductor (three-pole coupling, cable and socket outlet and plug). Any kind of disconnection of the protective earthed conductor whatsoever is forbidden. Risks on account of internal faults are thus avoided.
The main switch of the apparatus is also a safety switch. In the case of overload or short circuit, the main switch automatically falls back to the zero position. After the disturbance has been eliminated the apparatus can again be put into operation.

4.3 Extraction

The suction hose is connected to the hose connection (∅ 10 mm) on the suction tube. The fumes which result from hydrolization and the wash water arising from the filtering of the sample are extracted with the pump. The suction tube can be connected to a water jet pump or to a vacuum pump with an intermediate vessel. In order to achieve efficient filtration, the pump which is used should achieve good suction power and be resistant to the chemicals used.

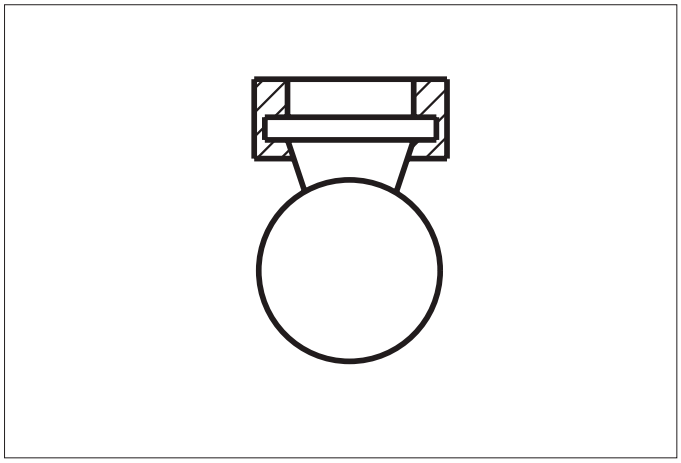

Figure 6: Suction tube with rubber coupling

4.4 Installation of the rubber couplings

The rubber couplings can be carefully installed on the suction tube and sample aspiration tube after moistening with water. In doing this, it is important to pay attention that the collar on the glass part comes to lie cleanly in the receptacle of the rubber part. The receptacles for the glass sample tubes are provided with an antistick coating, so that they can be easily installed and disassembled.
In order to avoid broken glass while installing the rubber couplings, the glass part must be held as near as possible to the receptacle collar.

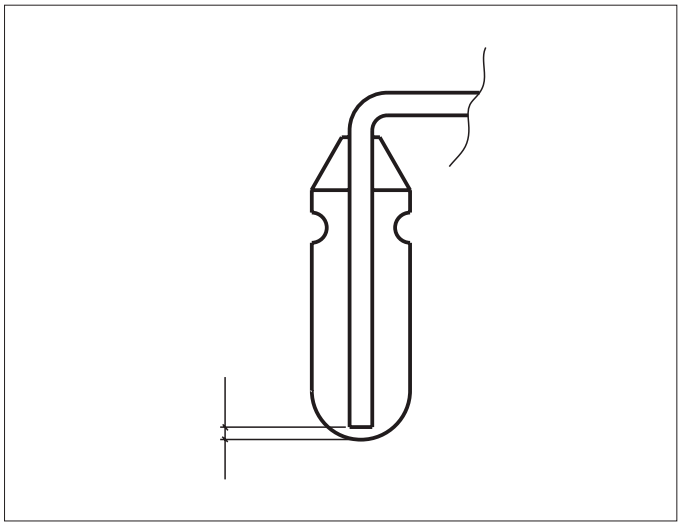

Figure 7: Overflow tube with digestion vessel

4.5 Filtration positioning

The distance between the sample aspiration tube and the digestion vessel must be approx. 5 mm.
In order to guarantee optimal filtration, it is necessary to correctly position the set collar.

5 Operation

Observe that the apparatus is put into operation in accordance with the instructions in Chapter 4, Putting into operation.

5.1 Description of the operating elements

Figure 8: Front panel

① Main/safety switch

② Energy regulator

③ Heating indicator lamp

5.2 Preheating

The “preheating” position serves to prewarm the heating and takes 10 minutes. In this way a quicker initial boiling point of the sample is achieved. The preheating must be carried out before the start of every hydrolysis.

5.3 Preparation of the samples

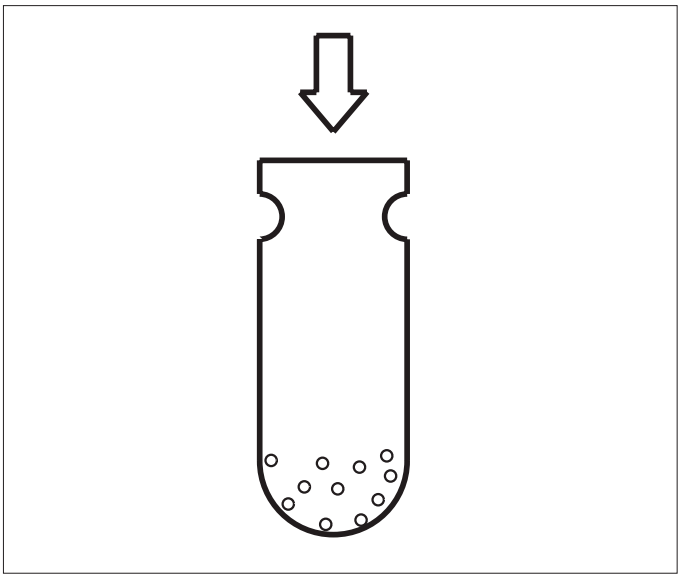

Figure 9: Adding Celite

Place 5 g Celite 545 in digestion vessel

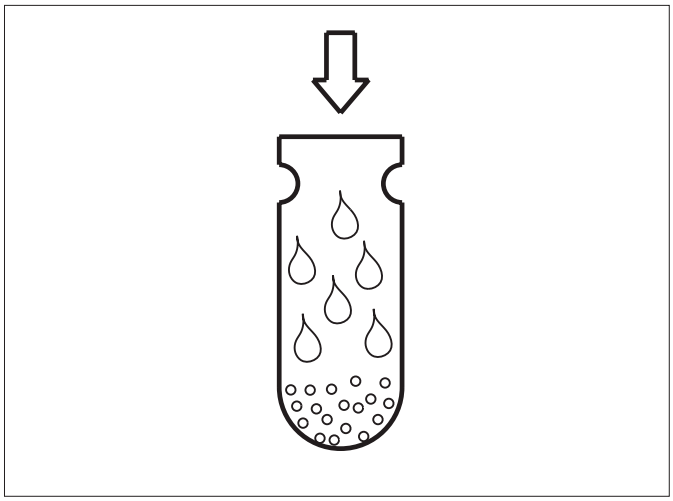

Figure 10: Drawing Add HCl

Add 50 ml HCl, 4 mol / l

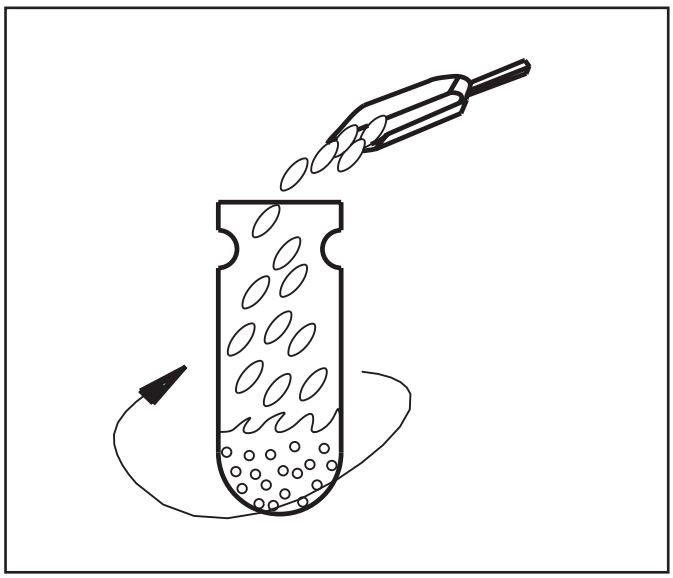

Figure 11: Sample + Mix

Weigh-in sample
Mix sample with Celite 545 and HCl

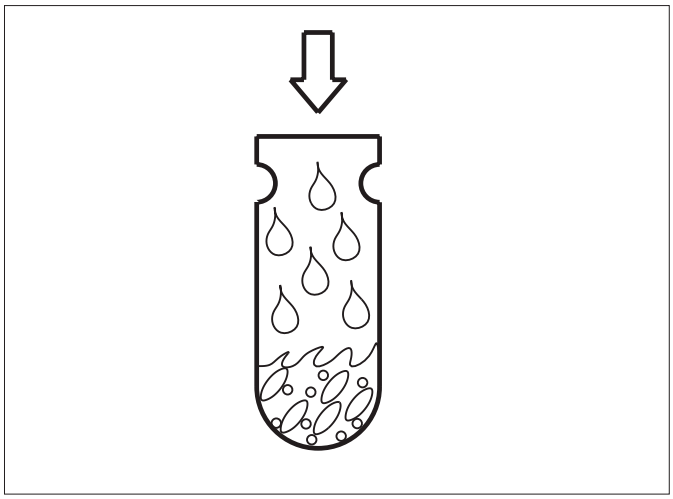

Figure 12: Drawing HCl rinse glass wall

Add 50 ml HCl, 4 mol / l, rinse glass wall

In the case of liquid samples, the acid concentration should be adjusted to the water content of the sample.

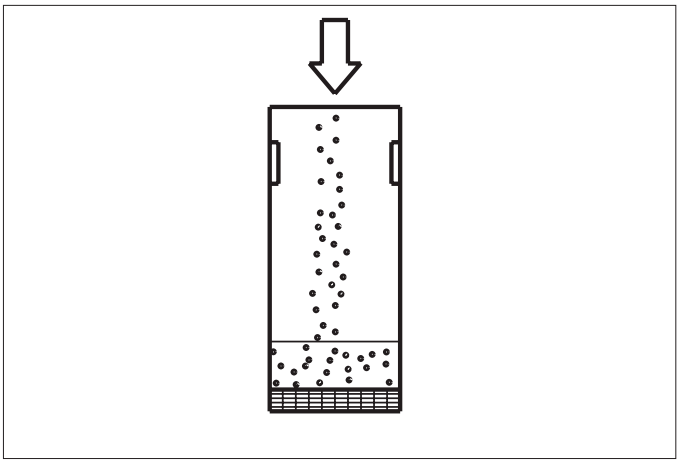

Figure 13: Quartz sand

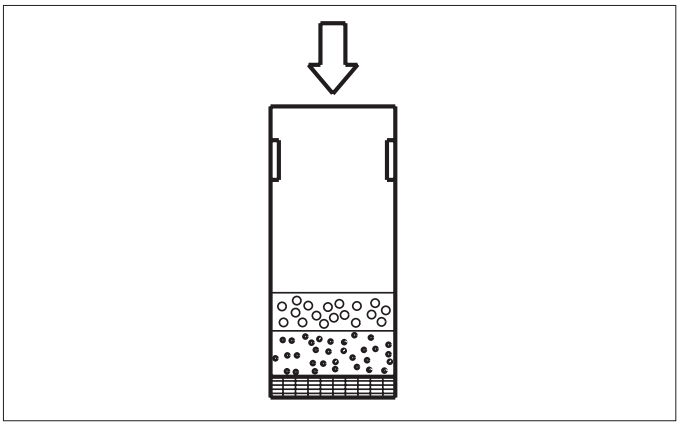

Figure 14: Celite

5.4 Preparation of the glass frits

Evenly distribute approx. 50 g quartz sand (grain size 0.3 - 0.9 mm / for example order code 37689). The grain size is important, as if it is too small, it will clog the glass frit and if it is too large,the celite will go through it during the filtration step.

Arrange a layer over this with 5 g Celite 545

5.5 Choice of heat output

Position 2 is to be recommended as the start position after preheating. According to boiling behavior, less heat can be supplied with the setting direction position 1 or more heat can be supplied with the setting direction position 3.

5.6 Hydrolyse

Hydrolysis

- Reduce heat output (position 1 - 3)
- Insert vessels with the samples in the apparatus
- Set the prepared frits in the rubber couplings
- Close unused locations on the suction tube with the supplied stoppers ∅ 45 mm.
- Lay the covers on the sample vessels, install sample aspiration tube
- Switch on the extraction device after the start of boiling process
- Hydrolysis time is dependent on the sample. From the start of boiling, it is a minimum of 15 and a maximum of 60 minutes.

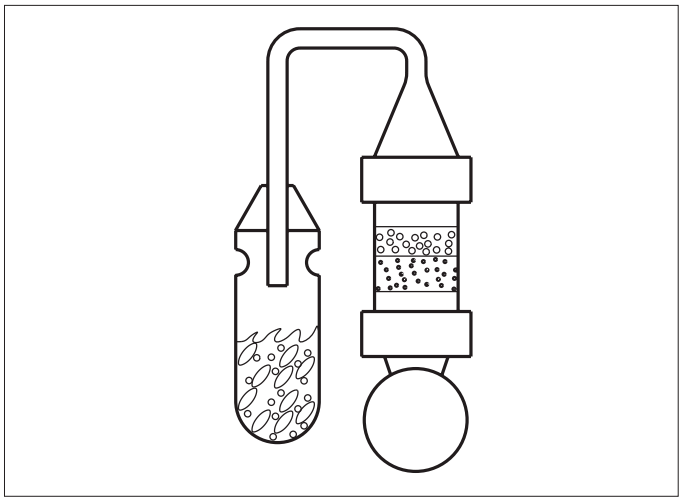

Figure15: Hydrolization

Bubbling over can be suppressed by the addition of small acid injections (HCl 4 mol/l). It is recommended that the extraction pump is first switched on after the samples are boiling evenly and no further foam is to be expected. In this way a premature extraction of the sample is avoided.

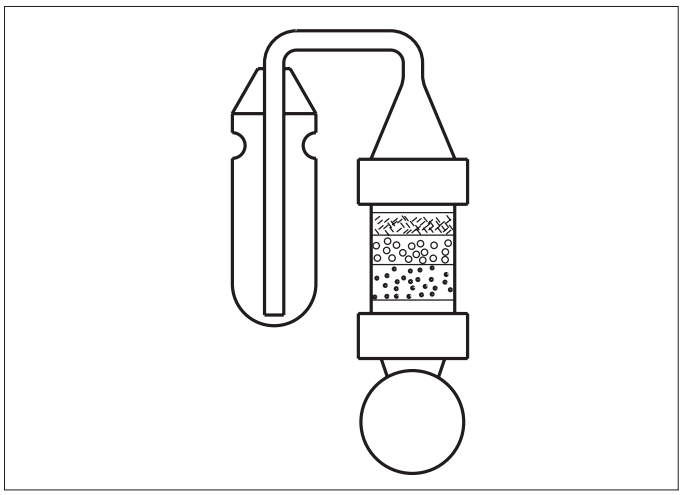

Figure 16: Filtration

5.7 Filtration

After expiration of the hydrolysis time, warm distilled water (40 - 50°C) is added to each digestion vessel to approx. 1 cm under the sample aspiration tube. The heating is switched off.

In order to filter the hydrolysate solution over the frits, the sample aspiration tubes are immersed in the solution through raising of the digestion vessels. As soon as the contents of the individual digestion vessels are completely extracted, it is rinsed with warm distilled water (40 - 50°C) portion by portion. The rinse volume until neutral reaction is approx. 250 ml per sample.

5.8 Drying the hydrolyzed samples

The drying of the samples can be carried out in accordance with the following methods:

a) With a microwave oven. This is the quickest and gentlest method.

The glass sample tubes in the plastic holder are placed in the microwave oven for drying. The drying time must first be optimized with the microwave model used.

Basic setting:
1. Step: 17 minutes with an output of 650 W
2. Step: 10 minutes with an output of 450 W

The sample is dry when there is no further moisture to be seen on the glass wall.

b) With a recirculatory drying oven
6 hours at 103°C

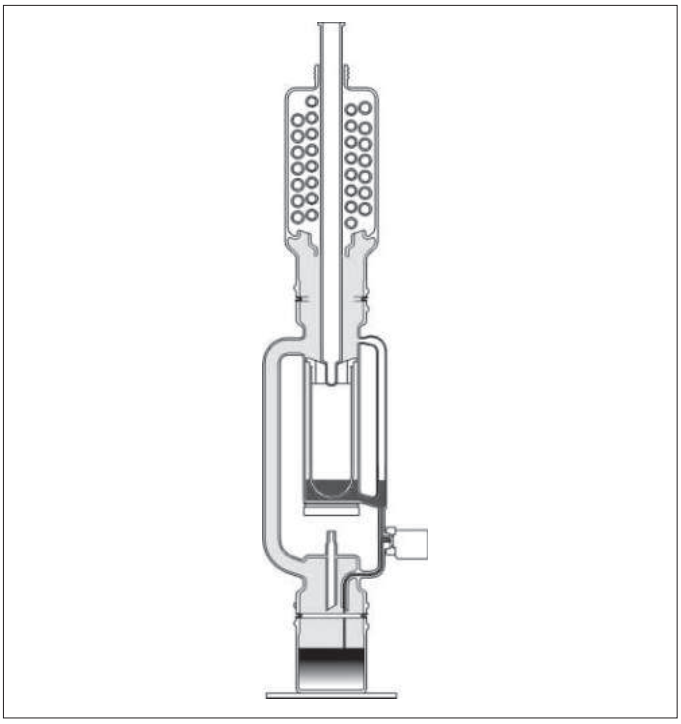

Figure 17: Drying

5.9 Preparation for the extraction

Fill the dried, cooled, glass sample tubes with quartz sand (grain size 0.3-0.9 mm / Order code 37689) to a max. of 3 cm under the upper edge and they are then ready for extraction. The glass sample tubes are optimized for use in the BÜCHI Extraction System B-811.

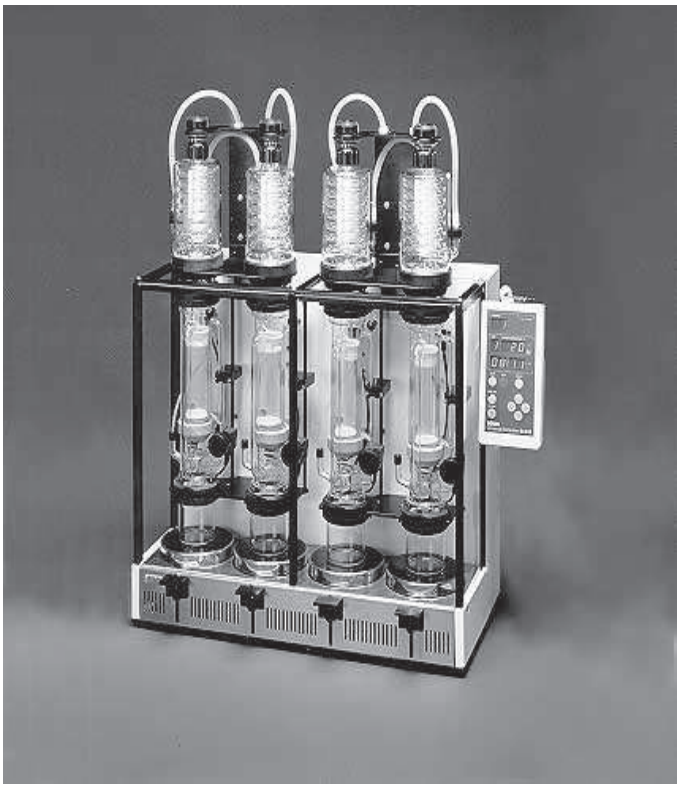

Figure 18: B-811

5.10 Extraction

An extraction with the BÜCHI Extraction System B-811 can bring fundamental advantages in comparison with other methods.

These are:

- Official methods
- Shorter extraction times
- Four selectable modes
- Adjustable solvent level
- Use of solvents with a boiling point of up to 150°C
- Automatic operation - less time present at the apparatus
- High solvent recovery

6 Maintenance

6.1 Cleaning

Disconnect the apparatus from electric mains before cleaning.

Housing
The housing is made of stainless steel and plastic. Acid splashes should be immediately wiped off with a moist cloth. The cleaning of the rust-free metal parts can be done with the usual chromium steel cleaners. The use of organic solvents (exception: ethanol) can lead to damage and is not allowed.

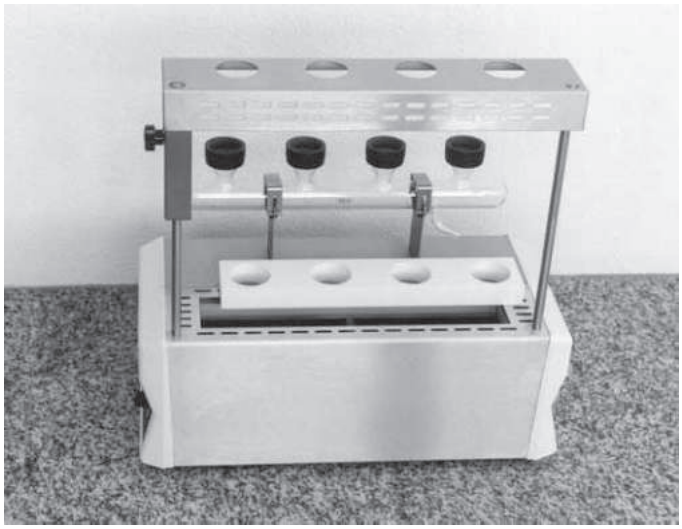

Bild 19: Insulation

Heating chamber
The apparatus must have cooled down before the upper insulation plate over the heating chamber is removed! After this, the heating chamber can be exposed through the removal of the insulation. It can now be cleaned with a moist cloth or a vacuum cleaner.

Glass parts
The glass parts can be removed and washed with commercially available cleansing agents. After cleaning and complete drying, every glass part is to be visually examined for chipped areas and crack development. Defective glass parts should not be used again.

Rubber coupling
The rubber couplings should be regularly washed off with water.

6.2 Functional inspection

A functional inspection should be carried out annually:

- Cleaning according to Chapter 6.1
- Visual inspection of apparatus, lift device, connecting cable, glass parts and hose connections.
- Start-up at preheating position and inspection as to whether heat is being given off.
- In the case of deviation, a BÜCHI customer service office should be contacted.

Figure 21: Device B-411, rear side

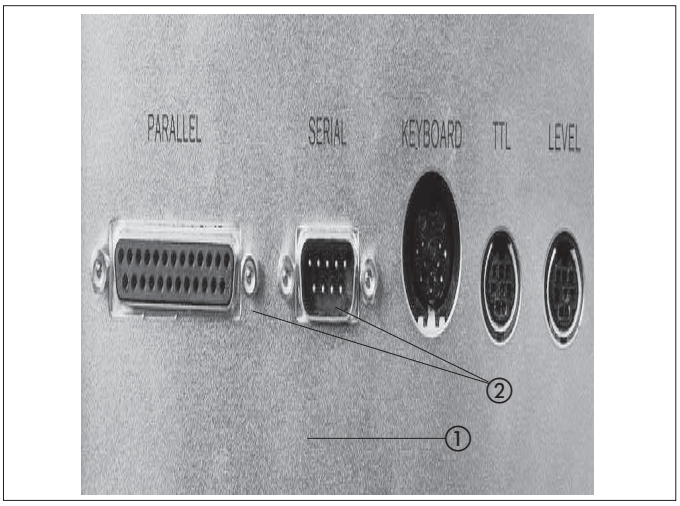

Figure 21: Device plug, inserted

6.3 Main fuses

Please change the main fuses as follows:

- Pull out mains cables
- Pull out fuse holders ①
- Replace the defective mains fuse by a new one with same performance ②:
  - 230V: T 5A L250V
  - 120V: T10A L250V
- Insert again fuse holders

6.4 Customer service

Operations on or in the apparatus can only be carried out by authorized service personnel. These are persons with a sound technical training and knowledge of the dangers which can result from not following safety precautions. BÜCHI customer service centers have apparatus-specific service manuals which are available only to authorized personnel.

The addresses of official BÜCHI customer service centers are given on the last jacket page of these operating instructions. Please contact one of these centers in the case of problems or technical queries as well as application problems.

BÜCHI company customer service is available for the following services:

- Replacement part service
- Repair service
- Maintenance service
- Technical advice.

7 Taking out of operation

Before the apparatus is shipped, the mains cable must be taken out and the suction tube rinsed and removed.

7.1 Storage/shipping

The apparatus is to be thoroughly cleaned. Chemical residues must be completely removed and the glass parts must be washed. The apparatus is to be stored and shipped in the original packaging.

7.2 Disposal

In order that the apparatus be disposed of in the most proenvironmental manner possible, there is in Chapter 9, Appendix, a list of the materials used. In this way it is ensured that the parts can be separated and recycled. Please observe valid regional and local disposal laws.

8 Replacement parts

Only Original BÜCHI accessories and replacement parts guarantee operational safety and the correct functioning of the apparatus. The use of other than BÜCHI replacement parts and accessories is only allowed with the permission of BÜCHI AG. The general safety regulations and Chapter 6 are to be observed by assembly and disassembly.
Check the operational reliability of the apparatus before start-up in accordance with Chapter 6.2.
Manufacture according to this handbook is forbidden.

Set of 4 digestion vessels 300 ml	**37377**
Set of 4 glass sample tubes (frits)	**37281**
Suction tube	**37387**
Sample aspiration tube	**37380**
Rubber coupling	**37381**
Set of 4 stoppers Ø 45 mm	**37725**
Set of 4 caps for digestion vessels	**37463**
Upper insulation plate	**37416**
Vacuum hose Ø 6 x 16 mm	**17622**

Table 3: Replacement parts

9 Appendix

9.1 Technical data

Measurements (width x height c depth)	275 x 600 x 570 mm
Voltage	230 V ± 10%, 50/60 Hz
	120 V ± 10%, 50/60 Hz
Power Rating	1100 Watt
Overvoltage category	II
Degree of pollution	2
Ambient conditions	for indoor use only, below 2000 m.s.l. maximum relativ humidity 80% for temperatures up to 30°C, temperature 10 - 40°
Weight	ca. 13,5 kg

Tabelle 4: Technische Daten

9.2 Materials used

Description	**Materials**	**Material code**
Glass	Borosilicate glass	3.3
Housing	Stainless steel	1.4301
Housing cover	Plastic	PPO + Glass fiber
Insulation heating	Alkaline earth-silicate fiber	
Rubber coupling	EPDM	

Table 5: Materials

9.3 FCC requirements (for USA and Canada)

English:

This equipment has been tested and found to comply with the limits for a Class A digital device, pusuant to both Part 15 of the FCC Rules and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is like to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Français:

Cet appareil a été testé et s'est avéré conforme aux limites prévues pour les appareils numériques de classe A et à la partie 15 des règlementation FCC à la règlementation des radio-interférences du Canadian Department of communications. Ces limites sont destinées à fournir une protection odéquate contre les interférences nétastes lorsque l'appareil est utilisé dans un environnement commercial.

Cet appareil génère, utilise et peut radier une énergie à fréquence radioélectrique, il est en outre susceprible d'engendrer des interferences avec les communications radio, s'il n'est pas installé et utilisé conformément aux instructions du mode d'emploi. L'utilisation de cet appareil dans les zones résidentielles peut causer des interférences nèfastes, auquel cas l'exploitant sera amené à prendre les dispositions utiles pour polier aux interférences à ses propres frais.

9.4 Conformity declaration

We
BÜCHI Labortechnik AG
Post office box, CH-9230 Flawil, Switzerland

declare in sole responsibility that the product:
BÜCHI Hydrolysis Unit **B-411**

to which this declaration refers is in conformity with the following standards:

EN 61010-1:1993 (~ IEC 1010-1, VDE 0411-1)
Safety regulations for measuring instruments, control instruments, automatic controllers and laboratory apparatus: General Requirements

EN 55011:1991/B (~ VDE 0875/B, VDE 0871/B)
Maximum permissible values and measurement technique for radio interference by industrial, scientific and medical high-frequency devices

EN 61000-3-2: 1995/1996
Limits for harmonic current emissions
EN 61000-3-3: 1995
Limitation of voltage fluctuations and flicker

In accordance with the regulations of the EU guidelines:
73/23/EWG (Electrical special tools/low voltage guidelines)
89/336/EWG (electromagnetic compatibility)

Flawil, 12.12.00

BÜCHI Labortechnik AG
Meierseggstrasse 40
9230 Flawil
Schweiz

Tel +41 (0)71 394 63 63
Fax +41 (0)71 394 65 65
buchi@buchi.com
www.buchi.com

Guido Worch
Qualitymanager