



## **FRIDURIT® ENVIRONMENTAL EQUIPMENT**

Technical description

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## INTRODUCTION ENVIRONMENTAL EQUIPMENT

You are interested in the purification of waste air and neutralisation of waste water in a laboratory environment. This technical description will provide comprehensive information about the FRIDURIT fume scrubber and the FRIDURIT neutralisation unit as a basis for planning your work. If you have other questions that are not covered by this documentation, we would be pleased to provide information and support.

Our product specifications are based on extensive technical development and the results from stringent tests. We have many years' experience in different application areas which allows additional safety with regard to the durability of FRIDURIT environmental equipment. However, it is the responsibility of the user to check our specifications and recommendations and conduct his own tests to confirm that they are suitable for his intended purpose. The statutory warranty provisions apply. We also refer to our General Terms and Conditions of Supply and Payment.

**We reserve the right to make technical changes.**

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Please visit [www.kyocera-solutions.com](http://www.kyocera-solutions.com).

**January 2020**

## FRIDURIT® ENVIRONMENTAL EQUIPMENT THE SYSTEM SOLUTION

When combined with fume cupboards, FRIDURIT fume scrubbers absorb aggressive and toxic gases produced, for example, from perchloric acid, hydrofluoric acid, sulfuric acid, hydrochloric acid, nitric acid and mixtures thereof. This contributes to maintaining clean air and preserving the building substance.

The FRIDURIT neutralisation unit is the perfect complement to the FRIDURIT fume scrubbers. The unit neutralises the acid or alkali waste water generated in the laboratory quickly, economically and reliably.



Fume scrubbers type C54 and C90 have been developed for installation in the laboratory fume cupboard.

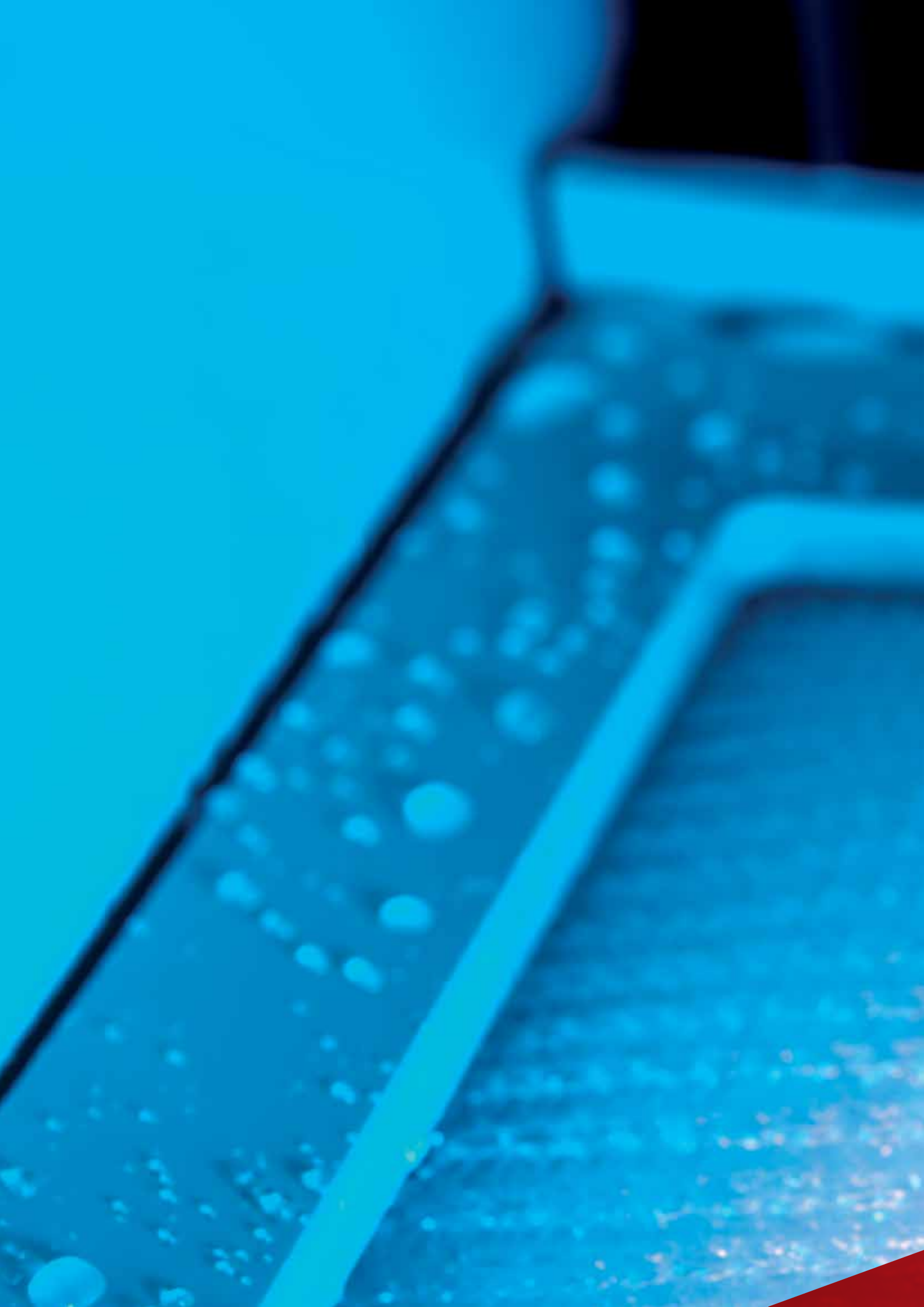


Fume scrubbers types C75 and C180 are intended as free-standing units for installation next to the laboratory fume cupboard. They can, however, also be installed in other places where pollutants are emitted.



The waste water produced when the fume scrubber is in operation can be neutralised by the FRIDURIT C100 neutralisation unit and can thus be fed directly into the public waste water network.



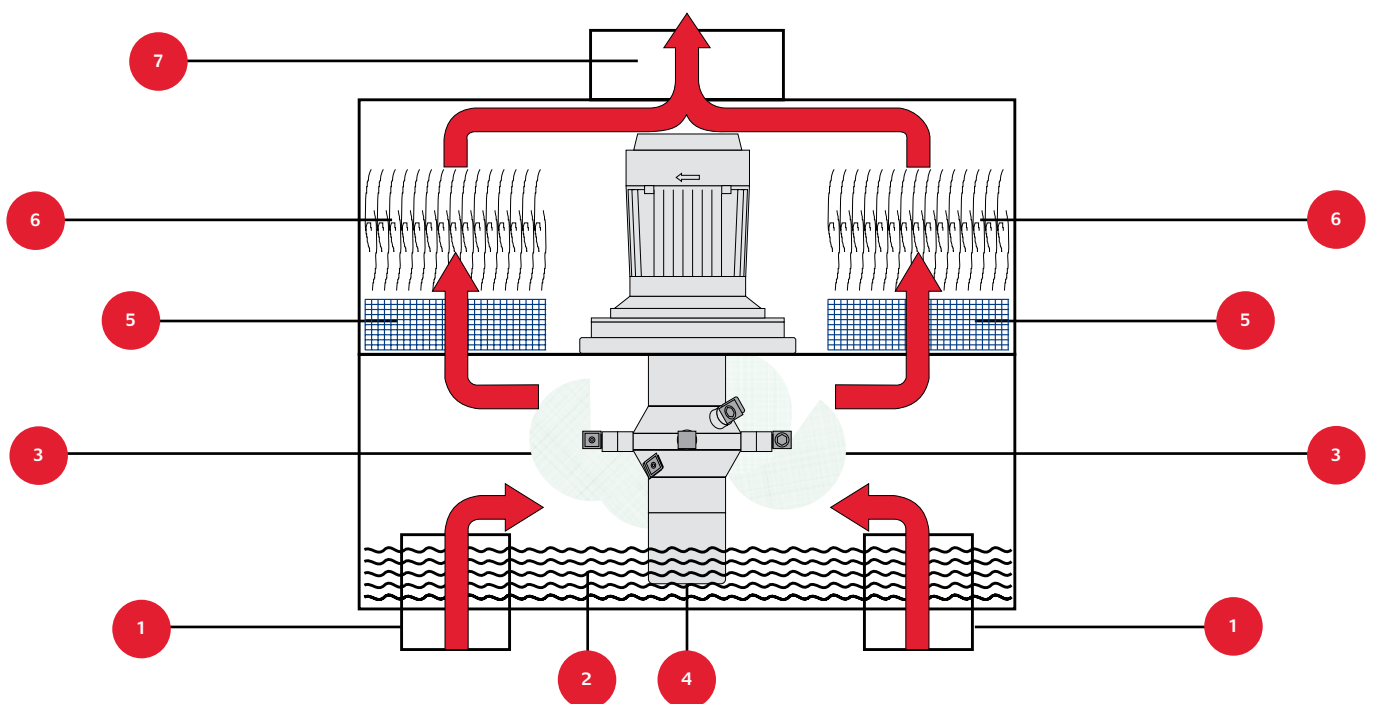






**FRIDURIT<sup>®</sup>**  
**FUME SCRUBBERS**

# FRIDURIT® FUME SCRUBBERS BUILT-IN UNITS C54/C90



## DESCRIPTION OF FUNCTIONALITY

Fume scrubbers C54 and C90 have the same set-up; their functionality and components are identical. The figures show type C54. Information about fume scrubber C75 and C180 can be found on the two following pages. A fan installed by the customer draws the exhaust air produced in the fume cupboard up through the fume scrubber. For this purpose, two noxious gas tubes (1) mounted in the base of the fume scrubber are connected to the interior of the fume cupboard. The air is conducted directly into the absorption chamber (3). The patented spray wheel (4), developed especially for this purpose, is located here and performs two functions simultaneously:

1. It sucks the scrubbing liquid from the scrubbing liquid's reservoir (2).
2. The spray nozzles nebulize the scrubbing liquid, distributing it evenly in the absorption chamber.

This ensures that the noxious gases are optimally mixed with the scrubbing liquid, thus leading to a highly effective degree of absorption.

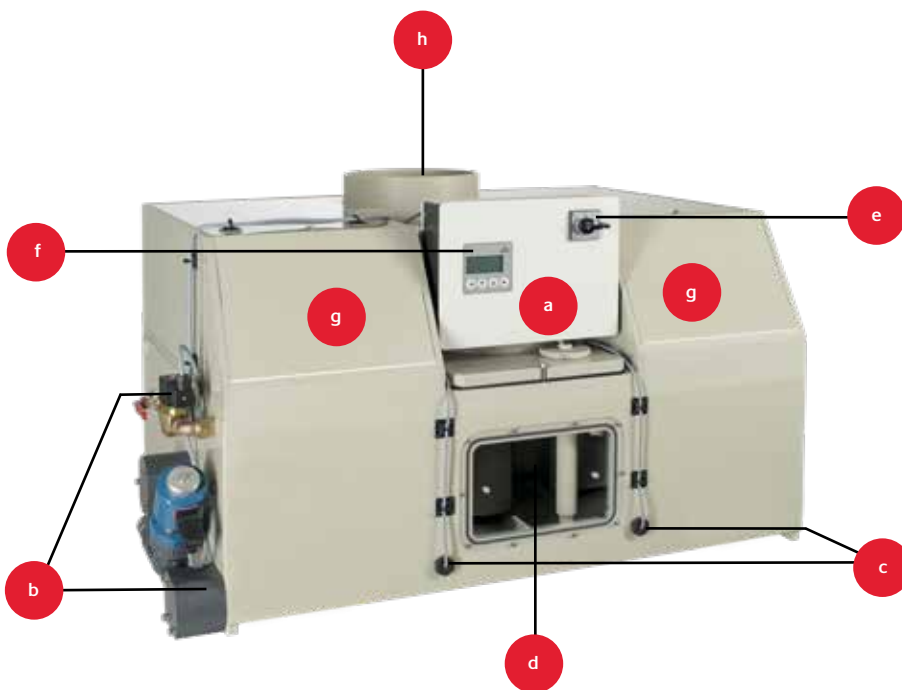
The fine droplets of scrubbing liquid spray enriched with chemicals condense on the plastic netting of the agglomerators (5) becoming larger drops of water that are fed back through the droplet separators (6) into the scrubbing liquid reservoir.

The cleaned air leaves the fume scrubber through the clean air connector (7). The level of scrubbing liquid (2) is regulated by level switches.

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**High degree of absorption efficiency of up to 97% despite compact design.**

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### EQUIPMENT COMPONENTS

The figure shows the FRIDURIT fume scrubber type C54 with its components:

- a. Electrical control unit containing all control and monitoring elements
- b. Sanitary connections for fresh water feed, waste-water outlet and emergency overflow
- c. Level switches regulating the filling level inside the scrubbing liquid reservoir
- d. Inspection window enabling visual check of the absorption chamber
- e. Repair switch isolating the control unit from the main power supply
- f. LCD-display with control keys: selection of automatic or manual scrubbing liquid exchange, change of settings, diagnose of inputs and outputs.
- g. Maintenance openings for accessing the absorption elements
- h. Clean air connector for the purified exhaust air leaving the fume cupboard to the ventilation system

### ELECTRICAL CONTROL

All electrical control and operational elements are integrated in the fume scrubber (a). This turns on the spray wheel motor and regulates the scrubbing liquid level. The solenoid valves are integrated in the fresh water feed (b) and the outlet (b); two level switches (c) measure the water level in the scrubbing liquid reservoir. A repair switch (e) isolates the control unit from the main power supply during service work. A LCD-display with control keys (f) allows selection of automatic or manual scrubbing liquid exchange, change of settings, diagnose of inputs and outputs.

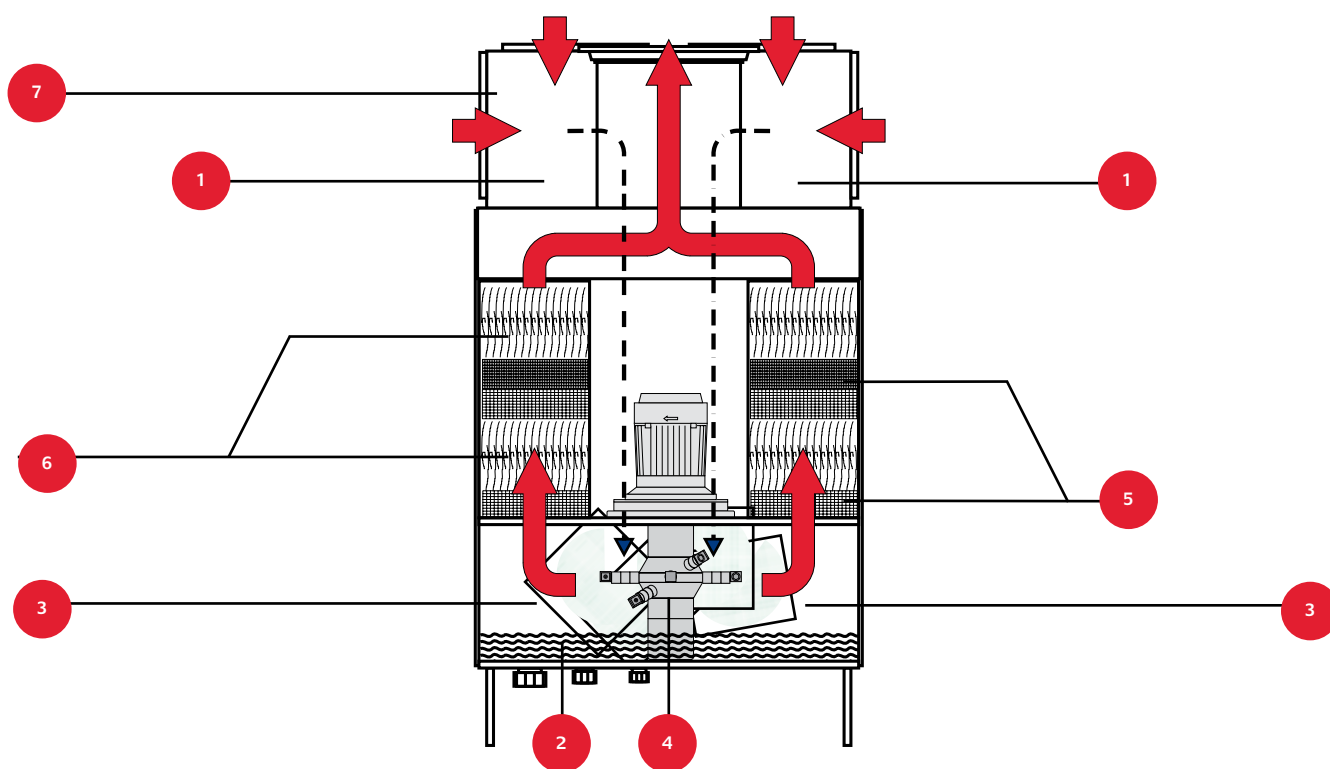
As soon as the fume scrubber is turned on, the solenoid valve opens the fresh water feed and water enters the scrubbing liquid reservoir. The water feed-in stops automatically when the pre-set filling level is reached. When the adjustable operating time has ended or the conductivity value has been reached (optional using conductivity measuring) part of the scrubbing liquid is removed and replaced with fresh water.

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**The FRIDURIT fume scrubber remains fully functional even while the scrubbing liquid is being changed.**

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## FRIDURIT® FUME SCRUBBERS FREE-STANDING UNITS C75/C180



### DESCRIPTION OF FUNCTIONALITY

Fume scrubbers C75 and C180 have the same set-up; their functionality and components are identical. The figures show type C180. The previous two pages provide information on fume scrubber C54 and C90. A fan installed by the customer draws the exhaust air produced in the fume cupboard up through the fume scrubber. Here a block flange (1) mounted above the fume scrubber is connected with the interior of the fume cupboard by means of a pipe. The air is conducted downwards through a channel into the absorption chamber (3). The patented spray wheel (4), developed especially for this purpose, is located here and performs two functions simultaneously:

1. It sucks the scrubbing liquid from the scrubbing liquid's reservoir (2).
2. The spray nozzles nebulize the scrubbing liquid, distributing it evenly in the absorption chamber.

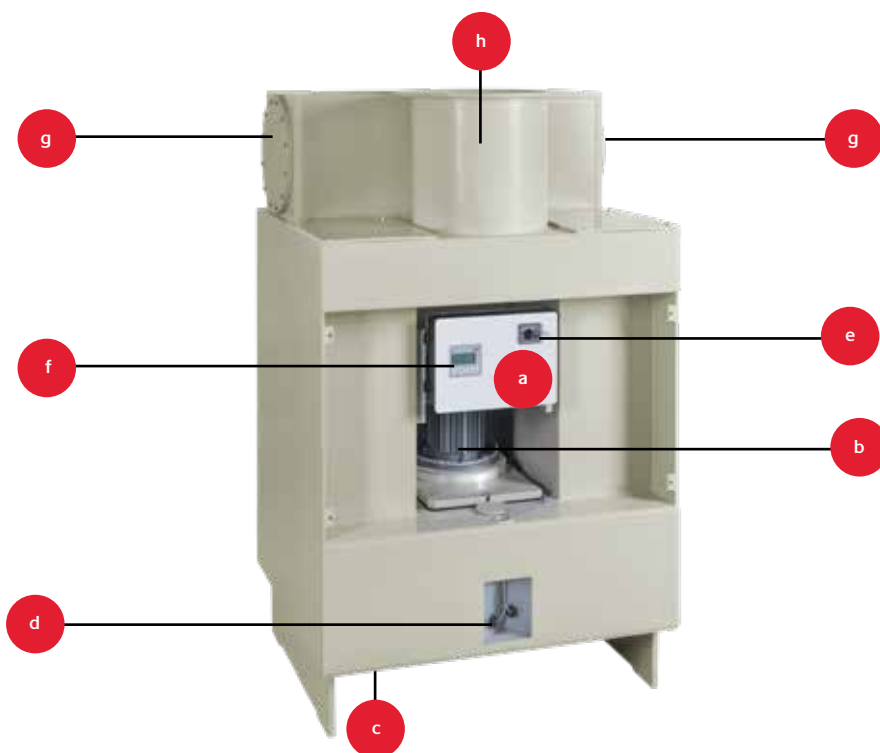
This ensures that the noxious gases are optimally mixed with the scrubbing liquid, thus leading to a highly effective degree of absorption.

The fine droplets of scrubbing liquid spray enriched with chemicals condense on the plastic netting of the agglomerators (5) becoming larger drops of water that are fed through the droplet separators (6) back into the scrubbing liquid reservoir. The cleaned air leaves the fume scrubber through the clean air connector (7). The level of scrubbing liquid (2) is regulated by level switches.

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**High degree of absorption efficiency of up to 97% despite compact design.**

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### EQUIPMENT COMPONENTS

The figure shows the FRIDURIT fume scrubber type C180 with its components:

- |  |   |
|--|---|
| a. Electrical control unit containing all control and monitoring elements  | e. Repair switch isolating the control unit from the main power supply  |
| b. Spray wheel producing the scrubbing liquid spray  | f. LCD-display with control keys: selection of automatic or manual scrubbing liquid exchange, change of settings, diagnose of inputs and outputs. |
| c. Sanitary connections for fresh water feed, waste water outlet and emergency overflow on the base of the fume scrubber | g. Noxious gas tube absorbing the unclean exhaust air   |
| d. Level switches regulating the filling level inside the scrubbing liquid reservoir                                     | h. Clean air connector for the purified exhaust air leaving the fume cupboard to the ventilation system   |

### ELECTRICAL CONTROL

All electrical control and operational elements are integrated in the fume scrubber (a). This turns on the spray wheel motor and regulates the scrubbing liquid level. The solenoid valves must be installed inside the piping or the hose connection leading to the fresh water feed (c) and outlet (c) in such a way that they are accessible to the user. An emergency overflow (c) prevents the fume scrubber overflowing in the event of a malfunction. Two level switches (d) measure the water level in the scrubbing liquid reservoir. A repair switch (e) isolates the control unit from the main power supply for service work. A LCD-display with control keys (f) allows selection of automatic or manual scrubbing liquid exchange, change of settings, diagnose of inputs and outputs. As soon as the fume scrubber is turned on, the solenoid valve opens the fresh water feed and water enters the scrubbing liquid reservoir. When a pre-set filling level is reached, the water feed-in stops automatically. When the adjustable operating time has ended or the conductivity value has been reached (optional using conductivity measuring) part of the scrubbing liquid is removed and replaced with fresh water.

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**The FRIDURIT fume scrubber remains fully functional even while the scrubbing liquid is being changed.**

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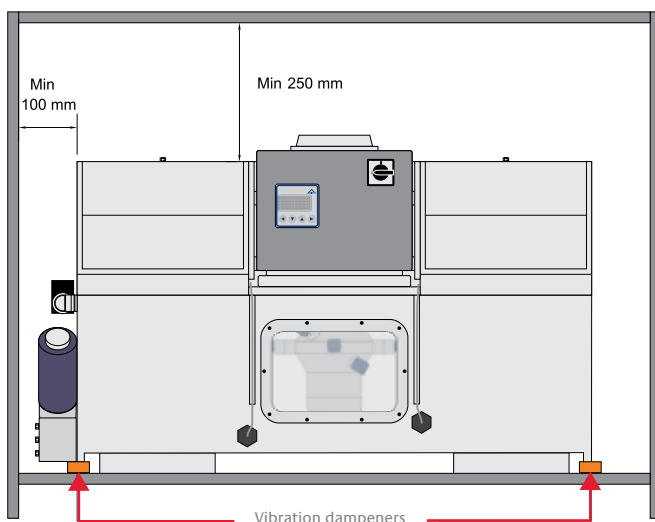
# FRIDURIT® FUME SCRUBBERS PLANNING AIDS

## MOUNTING REQUIREMENTS

The base for the FRIDURIT fume scrubber must allow level installation of the equipment. When constructing the base and fixtures, the filled weight of the fume scrubber must be taken into consideration (see Technical data). Sufficient clearance must be provided for maintenance and repair work.

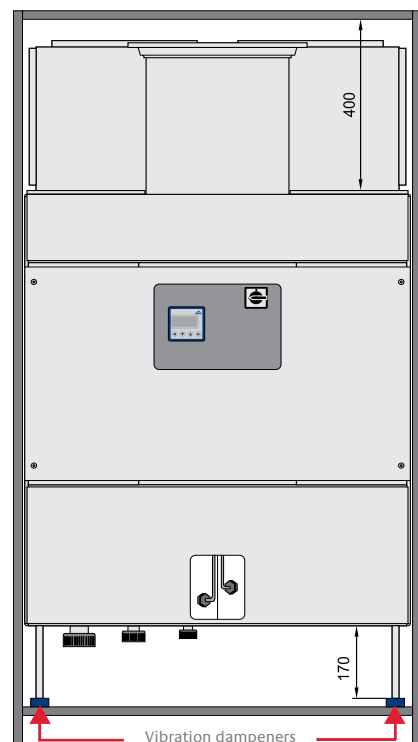
## NOISE REDUCTION

When the spray wheel rotates, vibrations are transmitted to the base during operation of the scrubber. The equipment should therefore be placed on vibration dampeners. The acoustic emission can also be reduced by applying noise-dampening profiles on the scrubber lining. Ideally, these are mounted with their absorption surfaces towards the front of the fume scrubber.



## MOUNTING OF TYPE C54 AND C90

Due to the design, both built-in units are 18 mm deeper on both side walls than the floor plate with the scrubbing liquid reservoir. We therefore recommend that side walls or the floor are used as supporting points. Concentrated load of the floor is not permitted.



## MOUNTING OF TYPE C75 AND C180

The free-standing units are mounted on a suitable base in a free-standing position. It is recommended that a cut-out is provided below the sanitary connections for easier mounting and servicing.

## ELECTRICAL CONNECTION

The FRIDURIT fume scrubber requires a three-phase connection, 400V, 50Hz, 16 amps. Power is supplied to the control unit on the equipment using a connection (Wieland GST18i5) and a cable approx. 1 metre long. An adapter cable for connection to a standard three-phase socket, CEE 16 amps, is usually included. The fume scrubber is usually switched automatically by means of the higher-level ventilation system. A voltage-free switch contact is required for this purpose. The contact is loaded with 24 volts direct current voltage and a maximum of 20 milliampere and connected to the circuit board of the electric control unit via terminals. The cable connection is located on the back of the control unit.

A fault indicator for building technology is also available. The voltage-free switch contact inside the control unit of the FRIDURIT fume scrubber can be loaded with direct current up to 30 volts and a maximum of 5 amperes. The fault indicator is secured against wire breakages, i.e. open if there is a malfunction in the control unit, otherwise closed. The terminals of the fault indicator are located on the circuit board of the control unit.

For built-in units C54 and C90, the electrical connection leads between the solenoid valves and the integrated control unit are pre-assembled and tested. For free-standing units C75 and C180, these must be prepared on site. The plug connections are supplied. For details about the FRIDURIT fume scrubber electrical connections see also the wiring diagram of the unit. It is enclosed with the operating instructions.

## WATER CONNECTION

### Recommended water quality

The quality of fresh water used should comply with the requirements of the German Drinking Water Ordinance and have a total hardness of less than 10° dH (German degrees). It is possible that fresh water components such as calcium or magnesium combine with washed out chemicals forming insoluble compounds; this can quickly lead to contamination of the fume scrubber and affect its functionality. Demineralized water (deionized water) reduces this to a minimum. : The fresh water feed is suited for demineralized water.

It consists of a manual ball valve, a soil trap and the solenoid feed valve and is located on the left side of the built-in fume scrubbers C54 and C90.

The water feed is connected to the water pipe by means of a hose or pipe connection. The pressure of the material used ranges

from 0.5 to 6 bar; other pressure ranges are available on demand. To prevent water damage in the laboratory, we recommend the use of metal-fitted tube material. Take note of the manufacturer's instructions regarding resistance, durability and pressure load.

The outlet on the FRIDURIT fume scrubber is used to empty the unit during automatic exchange of the scrubbing liquid and service work. The emergency overflow prevents the scrubbing liquid from leaking into the laboratory in the event of a malfunction in the water feed. During normal operation, it does not fulfil any function.

For built-in units C54 and C90, the outlet and emergency overflow are joined to form a single connection located on the left side of the built-in fume scrubbers. This comprises a connection piece for the outlet, a solenoid drain valve and a connection piece for the overflow. The complete construction can be

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**The operating module included in the scope of supply allows easy operation of the fume scrubber from the fume cupboard.**

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detached allowing the overflow hose to be connected even if space is restricted. When connecting to the downstream neutralisation unit or the outflow, we recommend using a fabric tube that is resistant to the chemicals contained in the scrubbing liquid.

For free-standing units C75 and C180, the sanitary connections are located on the bottom of the fume scrubber between the plastic strips. These are screw connections with union nuts made of PVC-U and allow the use of piping made of different plastic materials. As the scrubbing water is corrosive, metallic piping must be avoided. The fittings, such as the manual ball valves, soil traps and solenoid feed valves, are loose so that they can be installed in a way accessible to the user.

A suitable hose set for feed and outlet with stainless steel hose clips is available as an accessory (see Accessories).

## VENTILATION CONNECTION

The ventilation components for the FRIDURIT fume scrubber's air supply and waste air must be made of plastic. Otherwise there is a risk of components in the ventilation being damaged by residual humidity or chemicals after the scrubbing treatment. The ventilation connections and sockets indicated in the technical drawings are also supply limit.

## FAN SIZE

With regard to fan size, the air flow rate should ensure that contamination of the absorption systems is taken into consideration. The values stated in the technical data and pressure drop diagrams refer to new fume scrubbers. In practice, these values can increase by 30% due to operational contamination.

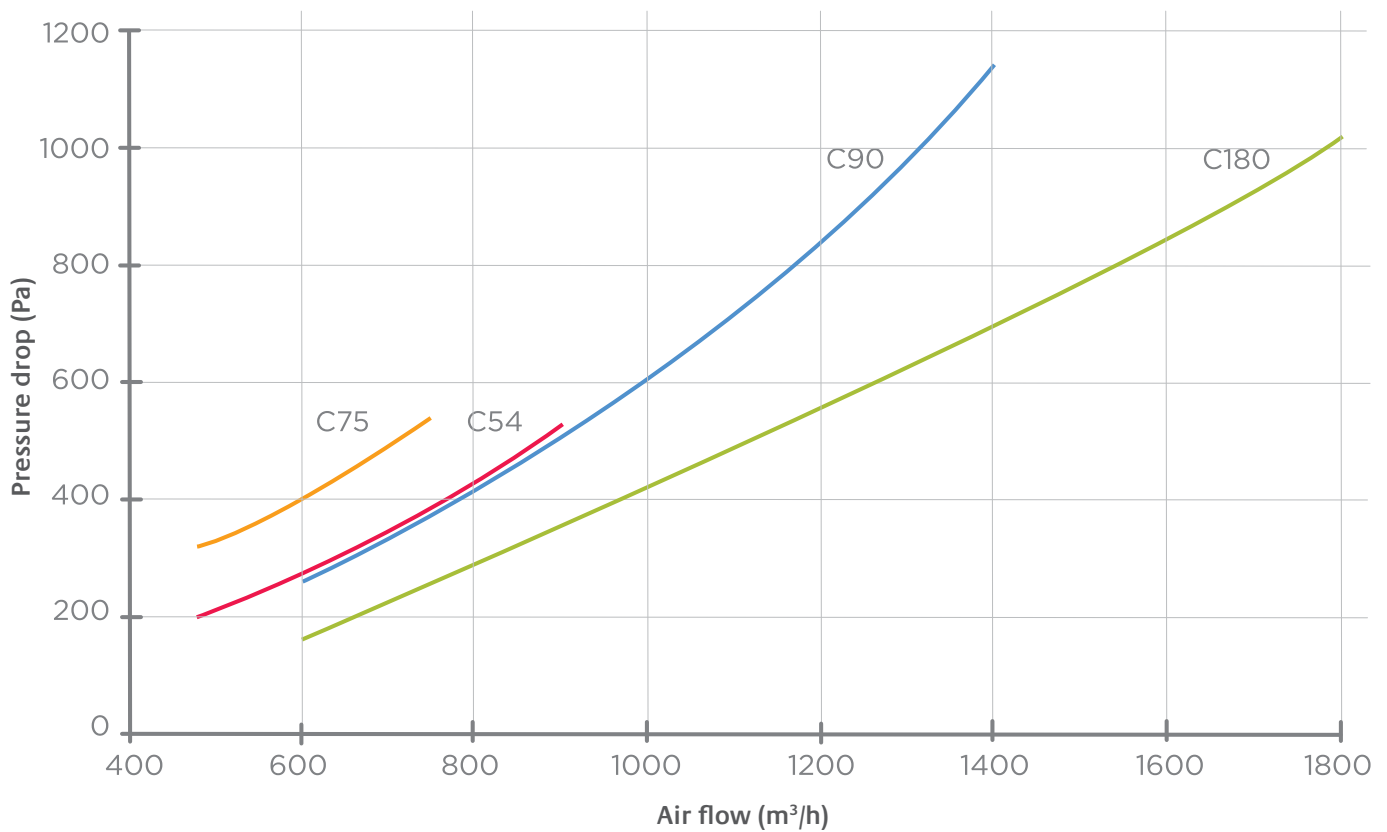
## OPERATING MODULE

Using the separate operating module, intended for mounting in the fume cupboard cover, the fume scrubber can be easily and safely switched off and on when the fume cupboard is in operation. The integrated operating light shows that the spray wheel is in operation. The fault light flashes if there is a fault in the spray wheel motor or the water feed.

## SAMPLING

Information on sampling according to 42nd German Federal Immission Control Act (42. BImSchV) is available on the internet. Please visit [www.kyocera-solutions.de](http://www.kyocera-solutions.de)

## FRIDURIT<sup>®</sup> FUME SCRUBBERS PRESSURE DROPS



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Approx. 30% less air resistance than when using comparable equipment.

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# FRIDURIT® FUME SCRUBBERS

## SCOPE OF SUPPLY AND ACCESSORIES

### SCOPE OF SUPPLY

The following components are supplied:

- ▶ FRIDURIT fume scrubber with integrated spray wheel and detachable electric control unit
- ▶ Solenoid feed valves with manual ball valve and soil trap, mounted on the fume scrubber for types C54/C90, supplied loose for types C75/C180
- ▶ Solenoid outlet valve made of PVC, mounted on the fume scrubber for types C54/C90, supplied loose for types C75/C180
- ▶ Operating module for mounting in the fume cupboard cover, with connection cable to control unit, 5 metres long
- ▶ Adapter cable three-phase socket CEE 16 amps, connection Wieland GST18i5
- ▶ Operating instructions and wiring diagram

### ACCESSORIES

FRIDURIT Laboratory technology provides a complete system for fume cupboards which includes the following components and/or accessories (available separately) to complement the FRIDURIT fume scrubber:

- ▶ **Conductivity probe**  
This can be used to check chemical contamination in the scrubbing liquid. The probe establishes the conductivity of the scrubbing liquid – measured in milliSiemens (mS). The higher the conductivity, the higher the degree of the chemical contamination. When a pre-set threshold value is reached, the scrubbing liquid is exchanged automatically.
- ▶ **Chemical dosing unit**  
To achieve a higher absorption level for special applications, the scrubbing fluid in the fume scrubber is mixed with a chemical (e.g. an alkali). The chemical dosing unit consists of a dosing tank, a dosing pump and a pH measuring device (the conductivity probe is not required).

- ▶ **Connection sets**

FRIDURIT Laboratory Technology supplies connection and cable sets suitable for the respective application. A suitable feed and outlet hose set, each with a hose 3 metres long, including stainless steel clamps, is available for the sanitary installations.

### TESTS

Each FRIDURIT fume scrubber is subjected to a final inspection prior to dispatch. The control unit of the fume scrubber and the leak tightness of each unit are tested.

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Prior to dispatch, each FRIDURIT fume scrubber is checked for functionality and adherence to internal quality criteria.

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# FRIDURIT® FUME SCRUBBERS

## OVERVIEW OF TECHNICAL DATA

	Fume scrubber C54	Fume scrubber C90	Fume scrubber C75	Fume scrubber C180
<b>Arrangement:</b>	Installation in the fume cupboard ceiling		Installation next to the fume cupboard or free-standing	
Materials used (parts with media contact)	Housing and spray wheel: Polypropylene, fittings: PVC-U, seals: EPDM/PTFE			
<b>Ventilation data:</b>				
Air flow in m <sup>3</sup> /h	480–900	600–1400	480–750	600–1800
Pressure drop in Pa	200–530	260–1140	320–540	160–1020
Air inlet	2 tubes DN 200 (underside)	2 tubes DN 200 (underside)	Block flange DN 200	Block flange DN 250
Air outlet	1 tube DN 250	1 tube DN 250	1 flange DN 200	1 flange DN 315
<b>Dimensions and weights:</b>				
Width in mm	950	1220	550	850
Depth in mm	710	710	750	750
Height in mm	550	550	1535	1535
Water volume in liters, approx.	45	60	45	70
Weight empty in kg, approx.	90	110	90	120
Total weight in kg, approx. (filled)	135	170	135	190
<b>Water connection:</b>				
Feed	DN 10	DN 10	DN 10	DN 10
Outlet	DN 32	DN 32	DN 20	DN 20
Overflow	DN 32	DN 32	DN 32	DN 32
<b>Inspection openings:</b>				
Inspection cover	2	2	1	2
Inspection window, front	Yes	Yes	No	No
<b>Electrical control:</b>				
Control unit	Plastic housing with electronic logic controller, LCD-display with control keys, switch unit for spray wheel motor, operating mode selector switch, repair switch, terminals for accessories, operating module with membrane keyboard			
Power supply	Three-phase 400/230 Volt, 50 Hz, 3L/N/PE, 0.55 kW. Connection using plug-in connector.			
Level control	2 level switches for minimum and maximum filling level			
Sanitary components	1 solenoid feed valve with soil trap and manual ball valve, 1 solenoid outlet valve.			
Scrubbing liquid exchange	Time-dependent control, times can be set within wide range, optional using conductivity measurement.			
Optional accessories	Probe with integrated measuring amplifier for measuring electrical conductivity, pre-alkalisation unit for scrubbing liquid. Additional accessories in the respective chapter.			
Protection type	Motor IP 54, control unit rear IP 40, front IP 54.			

# FRIDURIT® FUME SCRUBBERS SERVICE AND MAINTENANCE

## COMMISSIONING OF THE UNIT

The initial operation of the FRIDURIT fume scrubber should be performed by an experienced technician familiar with its functionality. This can either be a FRIDURIT service technician or a trained employee from the company installing the equipment. Commissioning includes the following:

- ▶ Checking the installation and functionality of the equipment (test run)
- ▶ Briefing the operating staff with regard to operation and calibration
- ▶ Answering any other questions

## MAINTENANCE

The FRIDURIT fume scrubber requires very little maintenance due to its design and high-quality components. Nevertheless, maintenance must be carried out regularly, even on equipment that is not used regularly, as damage and malfunctions can occur because of material fatigue.

The following schedule provides an overview of maintenance and inspection work that should be performed regularly. The work should only be carried out by employees with the following qualifications:

Maintenance and inspection work	Performed by	Recommended maintenance interval*
Visual check for leaks in the valves, housing and connection hoses	Operating staff	weekly
Visual check for deposits in the area of the inspection window	Operating staff	weekly
Check that plug-in connections on the fume scrubber and the valves are seated firmly	Maintenance staff	1-2 times a year
Visual check of the absorption chamber for deposits (sludge) on the floor	Maintenance staff	1-2 times a year
Cleaning the feed strainer in front of the solenoid feed valve	Maintenance staff	If there is a malfunction in the water feed
Complete inspection of the system in accordance with the manufacturer's requirements	FRIDURIT service	1 time a year

\* Note: Maintenance intervals should be adjusted individually depending on the degree of use.

### Operating staff:

Laboratory staff who use the equipment on a daily basis

### Maintenance staff:

Staff with technical basic knowledge

### FRIDURIT service:

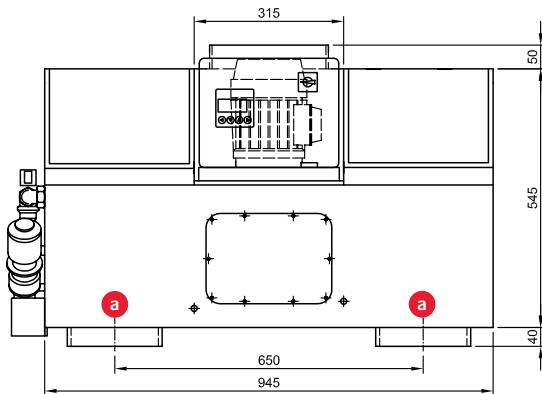
Trained service technicians familiar with the functionality of the equipment and potential dangers when carrying out the maintenance work.

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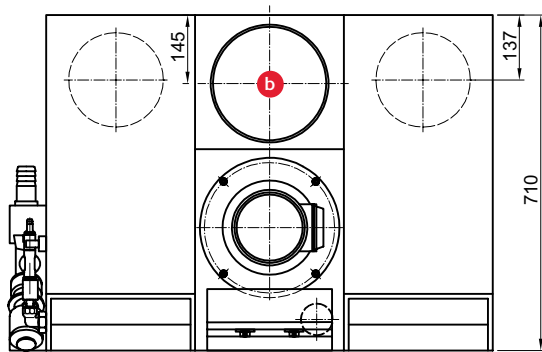
A well-organised service network together with numerous trade partners both at home and abroad provide support for any maintenance and repairs.

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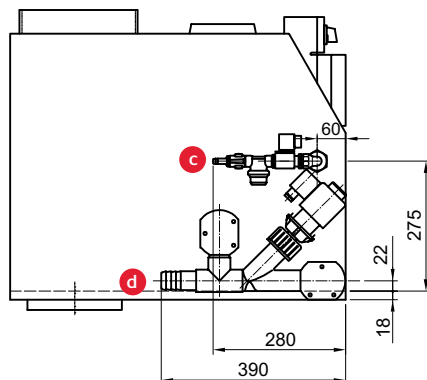
# FRIDURIT® FUME SCRUBBERS TECHNICAL DRAWINGS TYPE C54



a. Noxious gas inlet DN 200



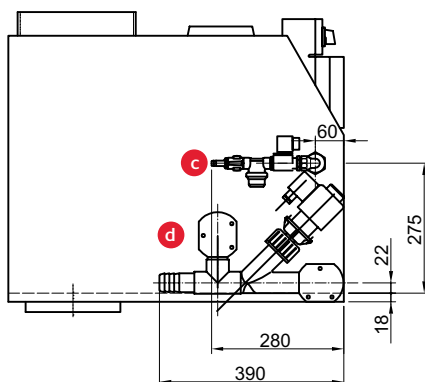
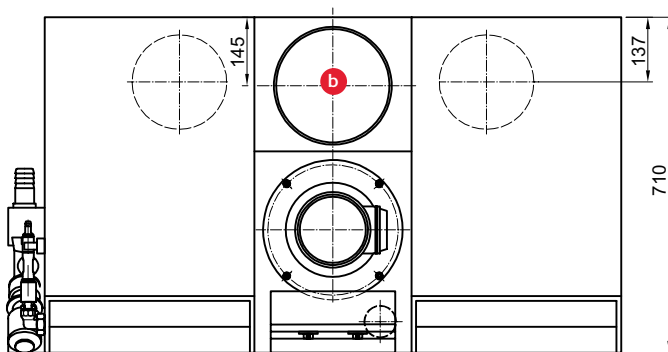
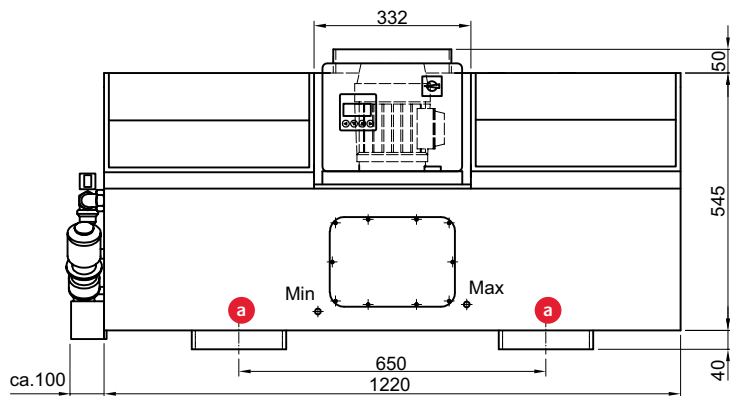
b. Clean air outlet DN 250



c. Feed DN 10

d. Outlet / Overflow DN32

# FRIDURIT® FUME SCRUBBERS TECHNICAL DRAWINGS TYPE C90



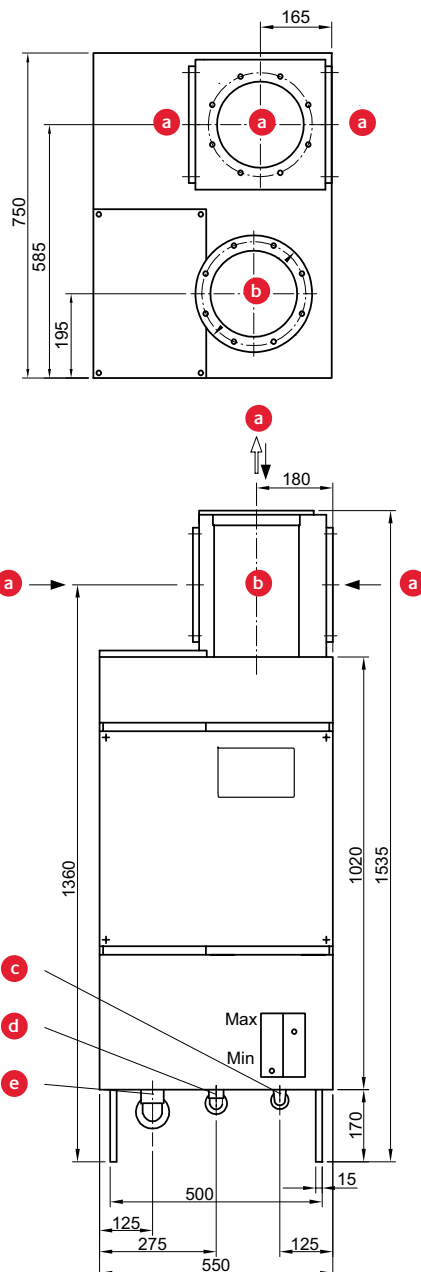
a. Noxious gas inlet DN 200

b. Clean air outlet DN 250

c. Feed DN 10

d. Outlet / Overflow DN 32

# FRIDURIT® FUME SCRUBBERS TECHNICAL DRAWINGS TYPE C75



a. Noxious gas inlet DN 200 with 8 thread inserts M6 on LK240

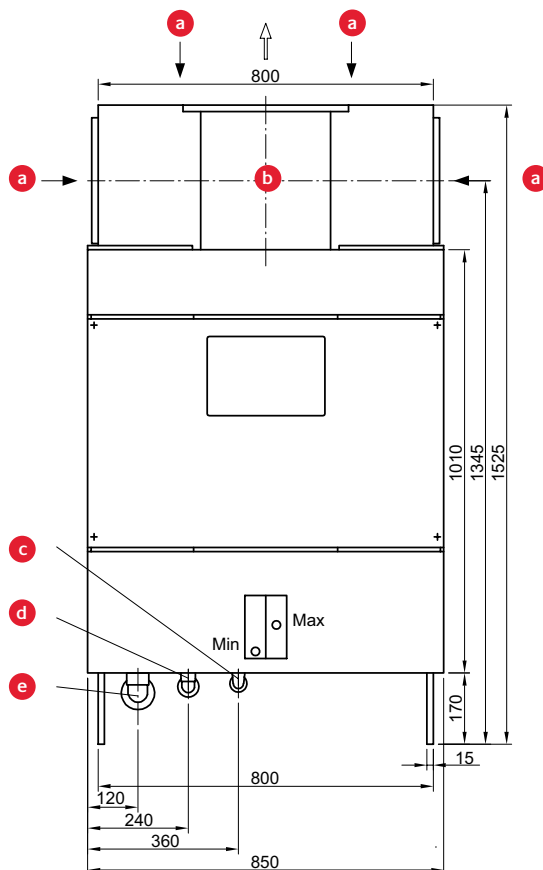
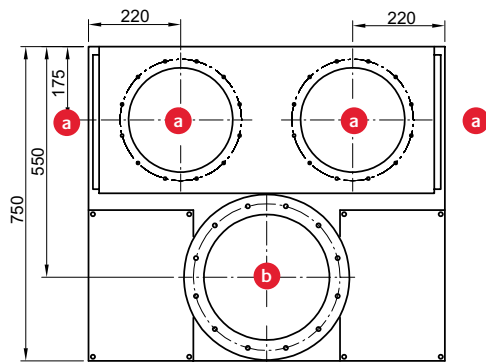
b. Clean air outlet with 8 holes Ø7 on LK 240

c. Water feed DN15 with screw connection and hose connector

d. Water outlet DN20 with screw connection and hose connector

e. Water overflow DN32 with hose connector

# FRIDURIT® FUME SCRUBBERS TECHNICAL DRAWINGS TYPE C180



- a. Noxious gas inlet with 12 thread inserts M6 on LK290
- b. Clean air outlet with 12 holes Ø9 on LK350

- c. Water feed DN15 with screw connection and hose connector
- d. Water outlet DN20 with screw connection and hose connector
- e. Water overflow DN32 with hose connector

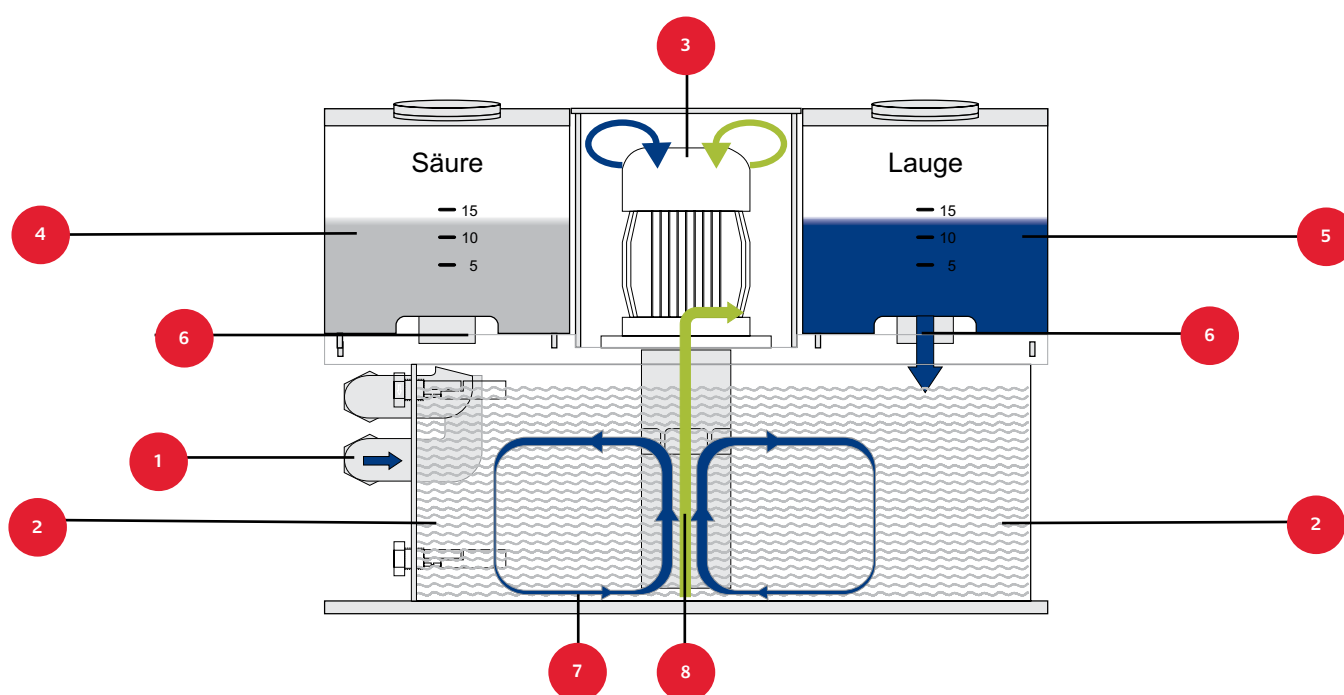






**FRIDURIT<sup>®</sup>**  
**NEUTRALISATION UNIT**

# FRIDURIT® NEUTRALISATION UNIT THE SYSTEM SOLUTION



## DESCRIPTION OF FUNCTIONALITY

The FRIDURIT neutralisation unit is used to neutralise acid and alkali waste water. With its electronic controller and specially designed mixer/pump unit, it is fast, reliable, fully automatic and self-regulating. It is compact, easy to assemble and service. Reaction chemicals are fed through nozzle valves without hose, tube and pumps providing maximum protection against contamination by acid or alkali.

The waste water is fed through the feed connection (1), collected in the reaction tank (2) and mixed (7) once the maximum level has been reached. After the premixing of the contents by the mix-pump-unit (3), acid (4) and alkali (5) from the storage tanks are added until the pH-value inside the reaction tank complies with legal requirements. Valves (6) mounted directly on the dosing tank dispense acid or alkali directly into the reaction tank without hose or tube connections.

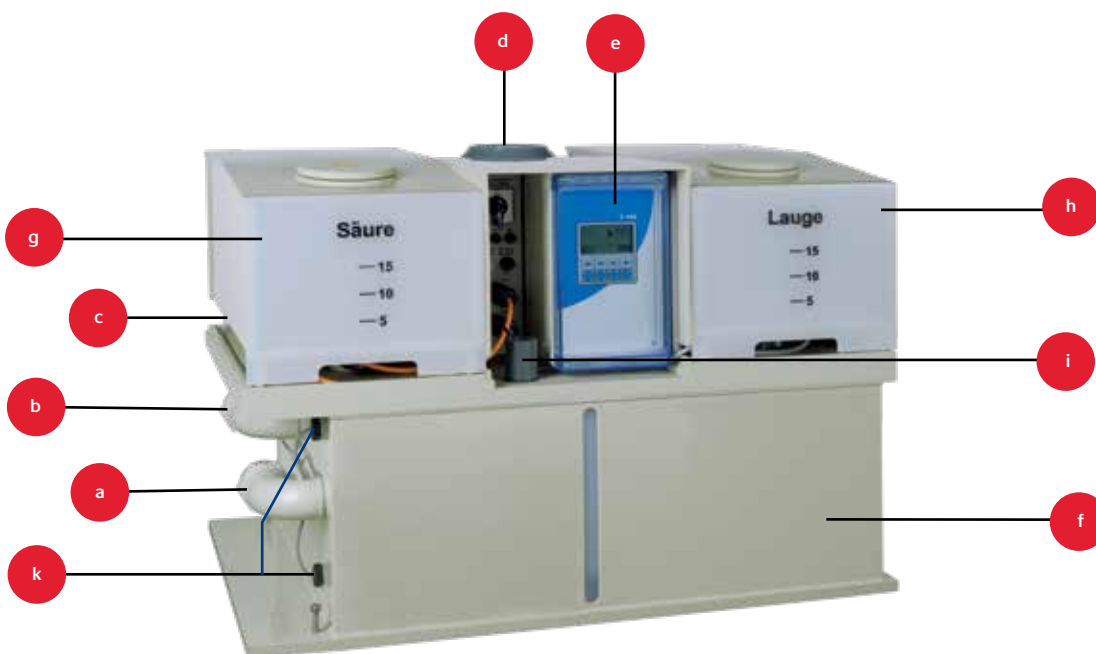
After reaching the neutral pH-value inside the tank and after a predefined control time, the reaction tank is discharged and its content pumped out into the waste water drainage (8).

The fully automatic batch operation is controlled by a special measuring, controlling and regulating unit equipped with microprocessor technology.

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**Acid and alkali are dispensed directly into the reaction tank without hose or tube connections.**

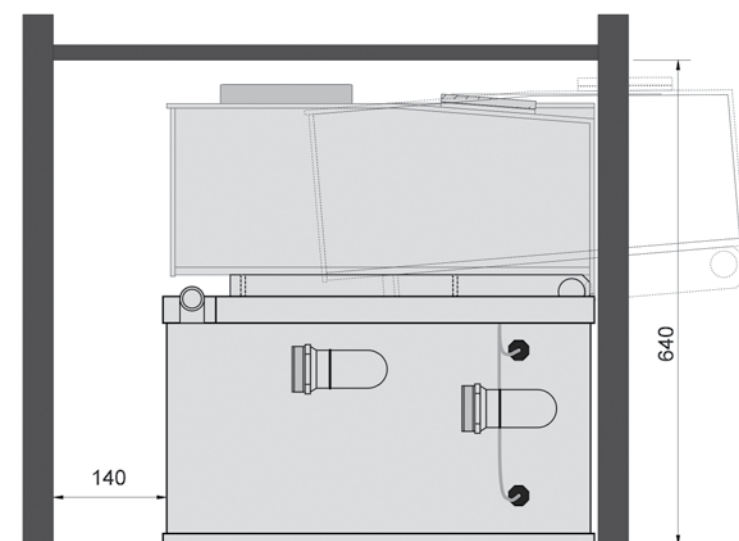
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#### EQUIPMENT COMPONENTS:

- a. Water feed
- b. Emergency overflow
- c. Ventilation
- d. Mix-pump-unit with pump out connection
- e. Electric control with pH measuring converter and user interface
- f. Reaction tank
- g. Storage tank with dispensing valve for acid
- h. Storage tank with dispensing valve for alkali
- i. pH single rod measuring cell with protective fitting
- k. Level switch

# FRIDURIT® NEUTRALISATION UNIT PLANNING AIDS



## MOUNTING REQUIREMENTS

The FRIDURIT neutralisation unit can be fitted to laboratory fume cupboard base cabins and under work benches. It can also be used as a free-standing unit. Sufficient clearance must be provided for maintenance and repair work.

## ELECTRICAL CONNECTION

The FRIDURIT neutralisation unit requires a three-phase connection, 400V, 50Hz, 16 amperes. The control unit on the equipment is supplied with electricity using a connection (Wieland GST18i5) and a cable approx. 1 metre long.

An adapter cable for connection to a standard three-phase socket, CEE 16 amperes, is included. An electric connection to the control unit of the fume scrubber blocks the water change mode during neutralisation process. The cable connection is located on the back of the control unit.

A suitable cable for connecting the control unit of the fume scrubber with the neutralisation unit is included. A fault indicator for building technology is also available. The voltage-free switch contact inside the control unit of the FRIDURIT neutralisation unit can be loaded with direct current voltage up to 30 volts and a maximum of 2 amperes, or with alternating current voltage up to 250 volts and a maximum of 2 amperes. The fault indicator is secured against wire breakages, i.e. open if there is a malfunction in the control unit, otherwise closed. The fault indicator is connected on the back of the control unit. The electrical connection lead for the optional motor ball valve must be prepared on site. The plug connections for this are supplied. See also the wiring diagram of the unit for details of electrical connections for the FRIDURIT neutralisation unit. This is enclosed with the operating instructions.

## SANITARY CONNECTION

The sanitary connections for feed and overflow of the neutralisation unit must be made of plastic. Otherwise there is a risk of damage to pipe fittings or connections due to the aggressive components in the waste water. This can cause physical injury and material damage. Releasable connections make it easier to install and disassemble the unit in practice. The sanitary connections and intersections indicated in the technical drawings are at the same time supply limits.

# FRIDURIT® NEUTRALISATION UNIT

## SCOPE OF SUPPLY AND ACCESSORIES

### SCOPE OF SUPPLY

The following components are included:

- ▶ FRIDURIT Neutralisation unit with reaction tank, mix-pump-unit, detachable acid and alkali tank
- ▶ Integrated electric control with mains connector and electric pH measuring and control unit with control keys and graphic display
- ▶ pH single-rod measuring cell with connection cable 1 metre long and protective fitting for plugging in the reaction tank
- ▶ Buffer solutions pH 7.0 and pH 4.0, 100 ml each, for calibration of the single-rod measuring device
- ▶ Adapter cable three-phase socket CEE 16 amperes, connection Wieland GST18i5
- ▶ Plug-in connections for peripheral equipment, locking and alarm
- ▶ Operating instructions and wiring diagram

### ACCESSORIES

As an extension to the neutralisation unit, FRIDURIT Laboratory Technology offers a variety of accessories that allow fully-automated neutralisation of smaller amounts of waste water.

#### ▶ Feed installation set

Allows reliable and fully-automatic locking of feed equipment such as a sink or a storage tank. Protects against heavy contamination, the set contains a manual valve and a soil trap. An automatic motor ball valve automatically locks the equipment. Opening and locking is controlled by the control unit of the neutralisation unit. The required connection lead must be prepared on site, the plug-in connections are included.

#### ▶ Storage tank

When the FRIDURIT neutralisation unit reaction tank has been filled and the neutralisation process started, waste water cannot be fed into the unit. Any waste water produced during the process must be collected and stored. The storage tanks together with the feed installation set fulfil this function. Maximum filling level controls and optical and acoustic alarm signals ensure that the waste water feed stops before the contain-

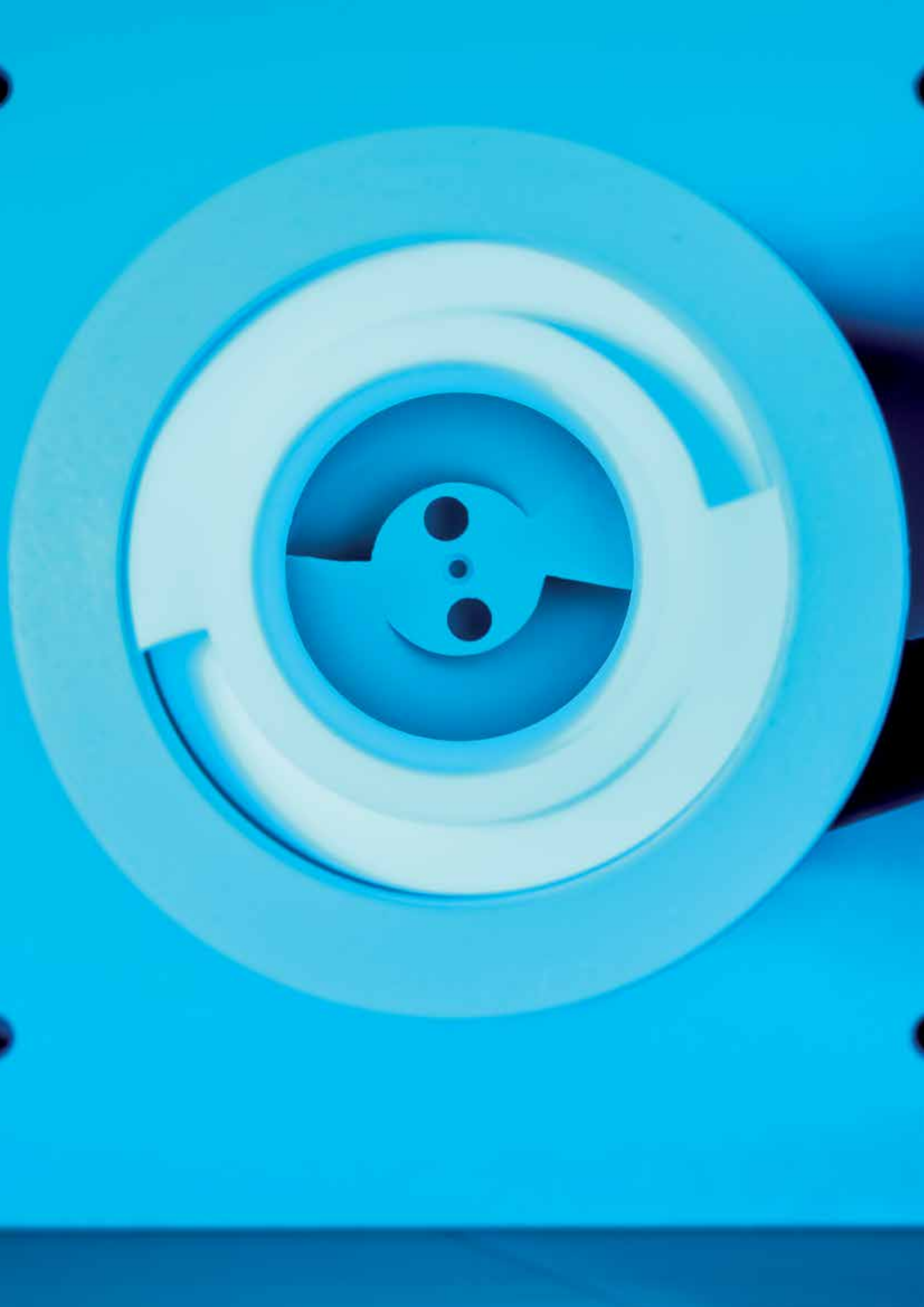
er overflows. A voltage-free relay contact (changeover contact) can be connected to a master control system. The storage containers are available with usable volumes 300 to 2000 litres.

### ADDITIONAL ACCESSORIES

FRIDURIT Laboratory Technology offers individual extensions to the above mentioned components, such as separate pH measuring for independent final control of the neutralised waste water or pump units for contaminated waste water.

### TESTS

Each FRIDURIT neutralisation unit is subjected to a final inspection prior to dispatch. The control unit, the pH measuring and the leak tightness of each unit is tested. Finally, the units are tested in accordance with EN 60204 Part 1.



# FRIDURIT® NEUTRALISATION UNIT

## OVERVIEW OF TECHNICAL DATA

### FRIDURIT NEUTRALISATION UNIT C100

<b>Arrangement:</b>	To be fitted in laboratory fume cupboards, under work benches or as free-standing unit
Materials used (parts with media contact)	Polypropylene, Polyvinylchloride (PVC) Polytetrafluorethylene (PTFE) and Ethylene-Propylene-Caoutchouc (EPDM)
Neutralisation performance	Maximum 200 l/h (depending on the level of contamination of the waste water)
<b>Capacity:</b>	
Mixing tank	approx. 90 l
Acid tank	approx. 25 l
Alkali tank	approx. 25 l
<b>Dimensions and weights:</b>	
Width	850 mm
Depth	570 mm
Height	620 mm / 640 mm
Weight empty	55 kg
<b>Connections:</b>	
Inlet size / inlet height	G 1½" interior thread / 180 mm
Outlet size / outlet height	Hose connector DN 15 / 440 mm (for hose with interior diameter 20 mm)
Overflow / overflow height	G 1½" interior thread / 250 mm
Ventilation / ventilation height	G ¾" interior thread / 340 mm
<b>Control:</b>	
Electrical connection	Three-phase 400/230 Volt, 50 Hz, 3L/N/PE, 0.55 kW. Connection using plug-in connector
pH-measuring	High resistance voltage measuring, measuring range 0-14 pH, floating, resolution 0.1 pH
Alarm contact	Voltage-free changeover contact, max. 250V AC, 2A, max. 50V DC, 2A
Operational unit	Film keyboard with background-lit graphic display 128x64 pixel and 43 operating keys
<b>Interfaces:</b>	<b>Optional:</b> analog interface 0-20 mA, serial interface RS-232
<b>Temperature range:</b>	Surrounding / medium temperature: +5 - +35 °C

# FRIDURIT® NEUTRALISATION UNIT SERVICE AND MAINTENANCE

## COMMISSIONING OF THE UNIT

The initial operation of the FRIDURIT neutralisation unit should be performed by an experienced technician familiar with its functionality. This can either be a FRIDURIT service technician or a trained employee from the company installing the unit.

Commissioning includes the following:

- ▶ Checking the functionality of the unit (test run)
- ▶ Calibration of the single-rod measuring device
- ▶ Briefing the operating staff with regard to operation and calibration
- ▶ Answering any other questions

## MAINTENANCE

The FRIDURIT neutralisation unit requires very little maintenance due to its design and high-quality components. Nevertheless, maintenance must be carried out regularly, even on equipment that is not used regularly, as damage and malfunctions can occur because of material fatigue.

The following schedule provides an overview of maintenance and inspection work to be performed regularly. The work should only be carried out by employees with the following qualifications:

Maintenance and inspection work	Performed by	Recommended maintenance interval*
Control of filling level of the dosing unit	Operating staff	At least weekly
Visual check for leaks in the valves, housing and dosing valves	Operating staff	Weekly
Checking that plug-in connections on the control unit and the valves are seated firmly	Maintenance staff	1-2 times a year
Visual check of the reaction chamber for deposits (sludge) on the floor	Maintenance staff	1-2 times a year
Cleaning the feed strainer in front of the motor ball (only if equipped with a motor ball)	Maintenance staff	1-2 times a year
Complete inspection of the neutralisation unit in accordance with the manufacturer's requirements	FRIDURIT Service	1 time a year

\* Note: Maintenance intervals should be adjusted individually depending on the degree of use.

**A well-organised service network at home and abroad provides support for any maintenance and repairs needed.**

### Operating staff:

Laboratory staff in daily contact with the equipment

### Maintenance staff:

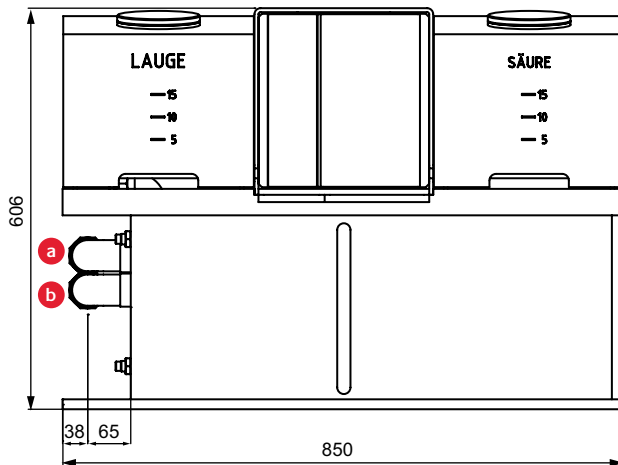
Staff with technical basic knowledge

### FRIDURIT service:

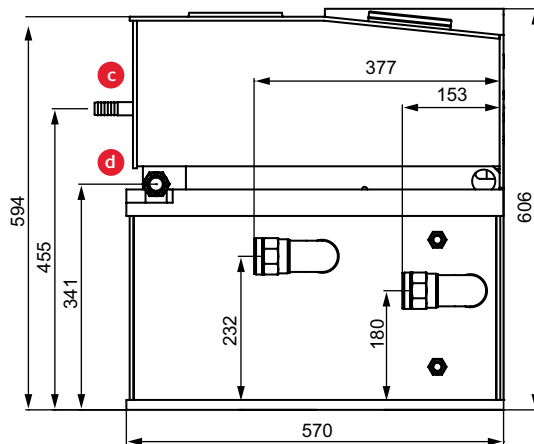
Trained service technicians familiar with the functionality of the equipment and the potential dangers when carrying out the maintenance work.



# FRIDURIT® NEUTRALISATION UNIT TECHNICAL DRAWINGS



- a. Water feed G 1 ½"
- b. Water overflow G 1 ½"



- c. Water outlet DN15
- d. Ventilation G ¾"



# LEGAL ENVIRONMENT

## LEGAL ENVIRONMENT AND ENVIRONMENTAL LEGISLATION

In accordance with provisions of the Federal Immission Control Act (Bundes-Immissionsschutzgesetz BImSchG), harmful effects on the environment should generally be kept to a minimum. In addition, the provisions of the Environmental Liability Act require high environmental standards and lowest emissions during planning phase.

The FRIDURIT fume scrubber allows for compliance with the following legal requirements:

- ▶ Observance of emission limit values for vaporous and gaseous inorganic compounds (Regulation by "TA Luft", Technical Instructions on Air Quality Control)
- ▶ Waste air cleaning directly in the fume cupboard (in accordance with EN 14175-7)
- ▶ Minimisation of emissions from laboratory fume cupboards (Guideline for laboratories, BG Chemie, DGUV Information 213-850)

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**FRIDURIT environmental equipment:  
For the environment and your safety**

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