made
in
Germany

# NECON

## Chemical-free water purification system

Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag

Forschungsnetzwerk Mittelstand AiF

2020 | 2021
INNOVATIVE THROUGH RESEARCH
Awarded by the Stifterverband
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Federal Ministry for Economic Cooperation and Development

“The company
with competence
and responsibility”

# The principle

As a result of our extensive collaboration with leading scientists and laboratories, NECON has succeeded in redefining the age-old principle of electrophysical water purification. The NECON system consists of the patented treatment electrodes, which release ions into the water precisely controlled by a microprocessor unit.

We have made enormous efforts to ensure that our claim of "100% chemical-free" water purification is fulfilled. Advanced automation technologies and novel electrode materials stabilize the ionization process even with fluctuating water quality and volume flow. Analytical data available from successful international NECON GmbH projects have repeatedly confirmed best water quality.

The NECON system efficiently eradicates bacteria, fungi, algae and biofilms from water and water supply systems, without being corrosive, irritant or caustic, is taste and odour-neutral and, according to the WHO and national guidelines is safe for humans even on long-term exposure – is there a more suitable water for the widest range of applications?

The most important advantage of the ions is that they are retained in the water and continue to provide long-term protection by purifying the water without the use of toxins. Even after the filter system has been switched off this depot effect persists for several months. Constant adjustments and permanent monitoring, which require continuous supervision, are therefore unnecessary. The NECON water purification system is easy to operate and requires minimal maintenance.

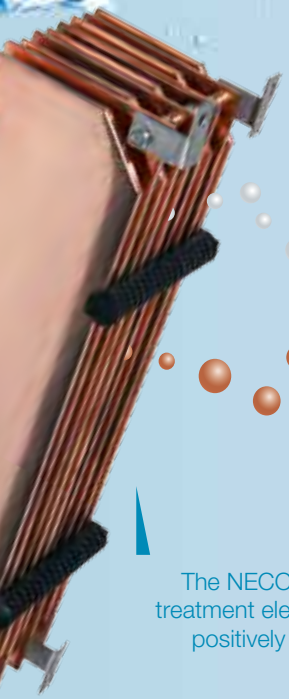
It has been demonstrated that just micrograms of copper and silver ions are sufficient for elimination of Cryptosporidium, E. coli bacteria, Pseudomonas, Legionella and many other pathogenic species. This method of water disinfection technology can be used in practically all situations where permanent eradication of bacteria, pathogenic microorganisms, algae and even fungal contamination is required.

## Average copper concentration in nutritional products

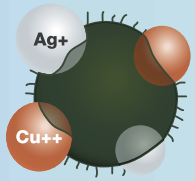
| | |
|---|---|
| Cow milk | 0.4 mg/kg |
| Beef | 0.9 mg/kg |
| Pork | 2.0 mg/kg |
| Game | 2.1 mg/kg |
| Cod | 5.5 mg/kg |
| Poultry | 3.4 mg/kg |
| Hens egg | 2.5 mg/kg |
| White bread | 2.0 mg/kg |
| Rye bread | 3.5 mg/kg |
| Oats | 8.8 mg/kg |
| Rice | 1.8 mg/kg |
| Potatoes | 2.2 mg/kg |
| Various types of cabbage | 1.5 mg/kg |
| Dried vegetables | 9.0 mg/kg |
| Various types of nuts | 5.0 mg/kg |
| Apples and pears | 0.9 mg/kg |
| Bananas | 1.3 mg/kg |
| **NECON purified water** (higher concentrations in some special applications) | **0.5–1.0 mg/L** |

# RAPID DISINFECTION

# LONG-LASTING RESIDUAL EFFECT



Searching for a balance for their positive polarity, the ions attach themselves to and penetrate the walls of bacteria and pathogenic microorganisms.

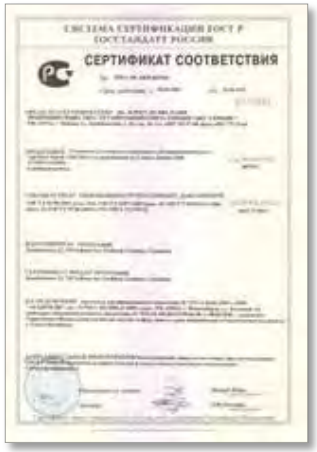



The NECON expendable treatment electrode produces positively charged ions

Photosynthesis and nutritional uptake of the cells is prevented; they rapidly succumb.

Residual effect:
Free ions remaining in the water prevent recontamination.

# Certificates & laboratory tests







# Agricultural applications

In the cultivation of crops NECON prevents the majority of fungal diseases, i.e. all those that rely on airborne transport. The advantage of the method is that the surrounding flora and useful microorganisms in the earth are hardly affected by the treatment, as the ions sprayed with the irrigation system develop their effects on the plant leaves. In addition, the method is safe for humans, as NECON-purified water is effectively of drinking water quality. Correspondingly there are no principle restrictions with regard to the frequency or duration of the treatment.

Other positive effects include strengthening of the plants due to the copper uptake from the earth and a marked improvement in root growth, together with the prevention of Legionella particularly in the context of overhead sprinkler irrigation, as the whole water supply system is kept free of pathogenic bacteria starting from the point of ionization.

NECON purified water can also prevent the spread of pathogenic bacteria and microorganisms in the fields of animal breeding, livestock husbandry and processing.

# Medical and cosmetic applications

Particularly dentists have discovered the advantages of the “NECON system” for ensuring the safety of patients and staff associated with a simplification of hygiene management. Reports from installations in the practice setting confirm reductions in bacterial counts to well below the regulatory limits or even to zero with a parallel simplification of the hygiene management. Even installations with older equipment and dentist’s chairs were permanently cleared of bacterial contamination even without conventional decontamination; in a further study not a single pathogenic microorganism was detected even after a vacation break of several weeks.

Initial applications in the cosmetic field are relevant to ensuring a germ-free water supply for production equipment and the prevention of bacterial burden due to contamination over the shelf life of the product. In addition, it can be assumed that the application of bactericidal and fungicidal ions increases the skin-improving effects of the products; relevant large-scale trials are currently underway in the context of research projects.

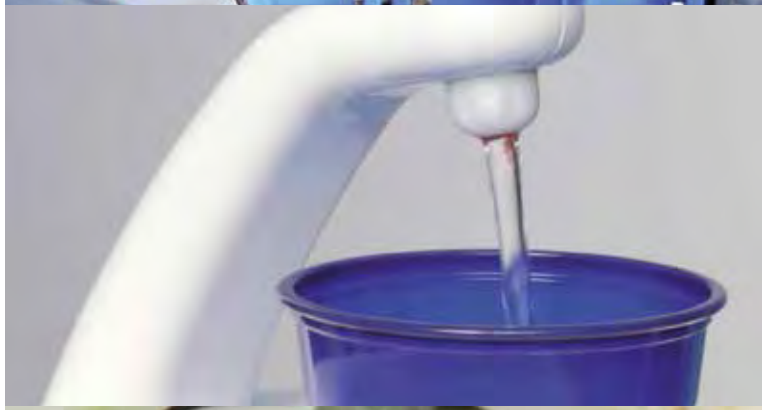
# Treatment of Legionella

Copper-silver ionization is the most effective method of eliminating Legionella in water supply systems. In the United Kingdom alone, systems of this type have been installed in more than 1100 hospitals and nursing facilities.

NECON offers all the technical requirements for eradication of Legionella: volume flow-dependent dosing, automatic monitoring and regulation of copper levels, remote access to the operating parameters and recoding of parameter changes.

Cooling systems present a particularly broad spectrum of challenges with regard to water quality. The NECON system represents the most economic solution to organic contamination of the cooling water required for the installations (bio-fouling): Without additional chemicals it prevents bacteria, fungi and algae, eliminates any microbial contamination present and is completely non-corrosive. The need to drain water systems on account of accumulation of corrosive agents is avoided.

Together with the low maintenance requirement and extensive automation of the process, the NECON system represents both an efficient and economic solution for the prevention of microbes in cooling systems.



# Comparison of water purification system methods

| Method | Corrosion damage to pipes | Toxic | Temperature-dependent | pH-dependent | Development of lime scale | High energy consumption | Rapid re-contamination with microorganisms after treatment | Residual effects | Simple application | Evaluation |
|---|---|---|---|---|---|---|---|---|---|---|
| **Heat shock** | × | — | × | × | × | × | × | — | — | – Unsuitable for large-scale units, hot water hazard |
| **Maintenance of constant high temperatures** | × | — | × | × | × | × | × | — | — | – Unsuitable for large-scale units, hot water hazard |
| **Pulse chlorination / shock over-chlorination** | × | × | × | × | × | — | × | — | — | – Precautionary measures for operation<br>– Waste water restrictions |
| **Continuous chlorination** | × | × | × | × | × | — | × | × | — | – Precautionary measures for operation<br>– Waste water restrictions |
| **Chlorine dioxide / monochloramine** | × | × | × | × | × | — | × | × | — | – Precautionary measures for operation and against explosion |
| **Use of ions** | — | — | — | — | — | — | — | × | × | – Highly effective, with long-term protective effects |
| **Hydrogen peroxide (“active oxygen”)** | × | × | — | × | — | — | × | × | — | – Water clouding due to carrier chemicals or degradation products |
| **Ozone** | × | × | — | — | — | × | × | — | — | – Water clouding due to carrier chemicals or degradation products |
| **Ultraviolet light** | — | — | — | × | — | × | × | — | × | – Not safe for humans as a sole method of disinfection |

× = applies
— = does not apply

# Water purification for swimming pools and whirlpools

Banish chlorine and all other chemicals from your swimming pool with the "NECON system"! If you have your own swimming pool, you, your family and guests can enjoy pure, natural fresh water of the best quality. With the "NECON system" public swimming pool operators create a safe environment free of pathogens even under peak load conditions, so that visitors return again and again for a sustainable, relaxing wellness experience or sport activities, without health risks.

As far as sport swimming is concerned, there are good reasons for the 100% chemical-free purified water long-preferred by athletes and trainers in the previous Eastern-block countries. The athletes swimming at the Olympic games in 2004 in Athens were privileged to compete under optimum conditions in NECON-water.

# Comparison of NECON with conventional water disinfection: example: swimming pool application

| Conventional (chemicals) | NECON (copper / silver) |
|---|---|
| Causes irritation of eyes and breathing system | No irritants in water or air |
| Causes dry, rough skin | Silky-soft skin |
| Pungent smell, especially indoors | Premises not affected by "swimming pool smell" |
| Shower after every bath, rinse hair, and wash bathing textiles | Dry off after bathing and be done! No chemical smell on body or bathing textiles |
| Chlorine is hazardous | Copper is healthy (essential element) |
| Backwashing water requires special disposal | Backwashing water ideal for plant irrigation |
| Requires additional algae control | No separate algicide required |
| Requires additional agents during winter breaks | No additional agents required during winter breaks |
| Requires additional flocculation agents | Natural flocculation |
| Requires additional agents to adjust pH level | pH level generally not relevant |
| Continuous monitoring of critical water parameters | Copper-level check every 3 months |
| Frequent checks and replenishment of filling levels and reserves, plus secured storage | Electrode safely encased in treatment cell; inspection every 6 months |
| Risk of burns when handling liquid chemicals | Fully automatic and safe discharge of ions |
| Rapid loss of effectiveness when exposed to sunlight | Temperature-independent |
| Low buffer capacity | Long-lasting residual effect |
| Filter sand change every 2–3 years | Filter sand change only every 10 years |
| Yearly water change | Water change not required |
| Corrosive | Not corrosive |

# Latest model ranges

## nec-One

System for flow rate-controlled treatment of water volumes up to 15 liters/minute, for example in the dentist practice or for individual taps in the domestic environment.


## NEC-2000

System for time-controlled treatment of water volumes of up to 40 m³, including jacuzzis and above-ground pools.

NEC-10000 is a skid-mountable unit for supply of potable water in disaster relief or any situation where rivers, lakes or polluted ground water are the only available water sources.

Besides removing sediments and pathogen bacteria from the source water, its treatment adds a residual bactericidal effect to the water for long-term storage.


## NEC-9000

## NEC-4000


NEC-9000 and NEC4000 combine electrode with straightforward-operated controller to robust units, de-signed as the most universally applicable and powerful single-electrode NECON systems.

## NEC-6000


NEC-6000 is an optional add-on con-troller for NEC-9000 or NEC-4000 electrolysis units to provide comfort functions (centralized control of up to 16 attached units, may be equipped with special-purpose plug-in boards).


## NEC-10000

# NEC-10000

## Technical data:

Flow rate : max. 4 m3/h

Cartridge filter : 16/5 µ
Carbon filter : 2

Net weight : 572 kg

Dimensions (L x W x H mm) :
2220 x 1190 x 1840

230 V ; < 5 kW incl. optionally integrated pump; choice of 50 or 60 Hz. pump

Water inlet:
2" BSP inner thread (2" outer threat with included fitting)

Water outlet:
2" BSP outer thread + fitting to 60/63mm water hose


NEC-10000 unit at the NECON production facilities in South-West Germany.
One of a whole batch of units ready-to-go for drinking water project in Peru, supported by German government development aid.

**Scan QR code for more information on this project**

# NEC-10000

## The mobile solution!

Murky rivers and similar surface waters are standard water supply sources for rural communities.

*Rio Tumbes, Peru*

Solution: Use NEC-10000 to treat water at the source, then deliver to and store at water reservoirs.

Deployment of a skid-mounted NEC-10000 in Peruvian country-side, moving from place to place.




Bottled samples of water pumped from the stream on the right and treated by NEC-10000.

*All pictures courtesy Carlos Zárate E. Dipl.-Ing. M.Sc, www.Zarate-Consult.de Germany*

# NEC-10000

**One unit –**

**Multiple use !**

Once treated surface water is delivered to local water reservoirs in local villages, it may be supplied directly to households (via pipeline network, where existing) or collected by residents.

Same time, treated water may be also used for crop irrigation, or other purposes.

## 1 Drinking water

For communities that are not connected to municipality water supply networks and thus have no other option than to use untreated water sources.
**NECON now even treats arsenic pollution!**

## Disaster aid 2

Environmental disasters cutting-off whole geographic areas from supply of drinking water, call for high-output water treatment, **that may be swiftly deployed and moved between areas in need.**

Four applications – One solution: NEC-10000

## 3 Farming

Farmers face serious harvest-crippling due to

- polluted irrigation water,
- plant and crop fungus, and
- excess arsenic accumulation in produce (rice, wheat flour, vegetables).

**Authorities and purchasers of produce becoming aware of disease-causing arsenic accumulation in human body!**

## Industry use 4

Water as a resource becomes too valuable to be simply discharged into the canal or nearest river after use.

Increasingly, municipal water supply is subjected to quotas, often due to increasing dry periods.

**Thus production plants are forced to take water supply in their own hands.**

# NEC-10000

## Field test surface water:

## Treating stagnant water

Impressions of a stagnant pond in some Rhine valley backwoods.

This kind of water is the only drinking water supply available to millions of people worldwide.

Yet the solution is ready to go!


**Watch the video now:**

# NEC-10000

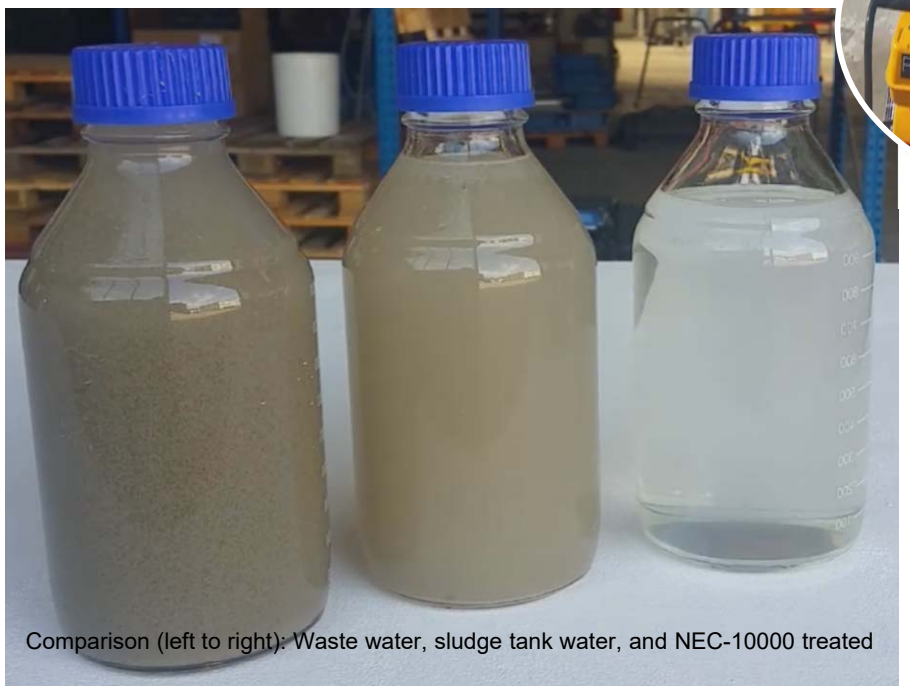
## Field test industry use:

## Treating water from sedimentation basin

Sedimentation is widely used as a first remedy for trying to better murky surface waters or to recycle process water.

Below-right comparison shows that treatment with NEC-10000 will greatly improve the result.

Besides, NEC-10000 operates fully automatic, whereas timely regular sludge removal from drinking water reservoirs tends to be neglected in remote areas with rather loose administrative networks.



Comparison (left to right): Waste water, sludge tank water, and NEC-10000 treated

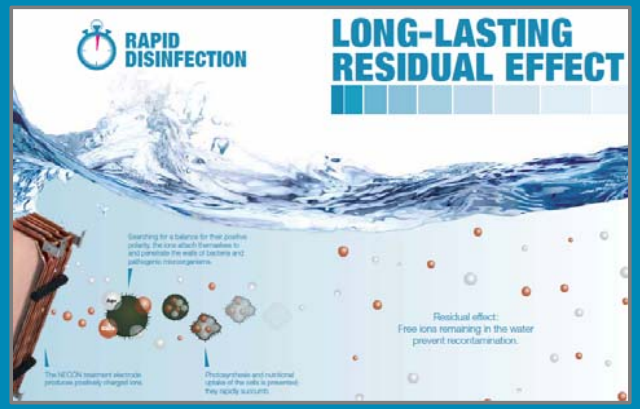
**Watch the video:**

# NEC-10000

## Much more than just filtration:

NECON water remains potable for extended period, enabling safe extended storage in reservoirs.

Achieved by combining filtration with NECON 100% chemical-free disinfection electrolysis:




Seite 1 von 1 **Prüfbericht Nr. 113464**

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**79331 Teningen**

19.10.2017

**Ihr Auftrag vom 09.10.2017:** **Untersuchung von zwei Wasserproben**
**Projekt:** **NEC-10000**

**Prüfbericht Nr.: 113464**

**Probennummer:** **GIU 113464/10/2017**
**Prüfgegenstand:** **Wasserprobe 2**
Probenahme: unbekannt Probenehmer: Auftraggeber
Probeneingang: 09.10.2017 Prüfzeitraum: 09. – 19.10.2017

Mikrobiologische Untersuchungen gemäß DIN 19643:2012-11:

| Prüfparameter | Dimension | Prüfverfahren | Messwert |
|---|---|---|---|
| Koloniezahl bei 22°C | KBE/ml | DIN EN ISO 6222 | **112000** |
| Koloniezahl bei 36°C | KBE/ml | DIN EN ISO 6222 | **56000** |
| E. Coli | KBE/100ml | DIN EN ISO 9308-1 | **10** |
| Coliforme Bakterien | KBE/100ml | DIN EN ISO 9308-1 | **170** |
| Pseudomonas aeruginosa | KBE/100ml | DIN EN ISO 16266 | **40** |
| Legionella spec. | KBE/100ml | DIN EN ISO 11731-2 | **0** |

BG = Bestimmungsgrenze RW = Richtwert KBE = Koloniebildende Einheiten

Sparkasse Freiburg Nördl. Breisgau BLZ 680 501 01 Konto-Nr. 20069997 IBAN DE50680501010020069997 SWIFT-BIC: FRSPDE66
Deutsche Bank Freiburg BLZ 680 700 30 Konto-Nr. 308908 IBAN DE13680700240030890800 SWIFT-BIC: DEUTDEDBFRE
Amtsgericht: FR • HRB 260814 USt.-ID-NR: DE 141993679 • St.-Nr. 05077/00947 Geschäftsführer: Dipl.-Chem.Hans Albrich Dr. Michael Müller
DAkkS Deutsche Akkreditierungsstelle D-PL-14433-01-00

**Microbiological testing results by German state-accredited lab**

Seite 1 von 1 **Prüfbericht Nr. 113465**

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**79331 Teningen**

19.10.2017

**Ihr Auftrag vom 09.10.2017:** **Untersuchung von einer Wasserprobe**
**Projekt:** **NEC-10000**

**Prüfbericht Nr.: 113465**

**Probennummer:** **GIU 113465/10/2017**
**Prüfgegenstand:** **Wasserprobe Probe 1**
Probenahme: unbekannt Probenehmer: Auftraggeber
Probeneingang: 09.10.2017 Prüfzeitraum: 09. – 19.10.2017

Mikrobiologische Untersuchungen gemäß DIN 19643:2012-11:

| Prüfparameter | Dimension | Prüfverfahren | Messwert |
|---|---|---|---|
| Koloniezahl bei 22°C | KBE/ml | DIN EN ISO 6222 | **20** |
| Koloniezahl bei 36°C | KBE/ml | DIN EN ISO 6222 | **20** |
| E. Coli | KBE/100ml | DIN EN ISO 9308-1 | **0** |
| Coliforme Bakterien | KBE/100ml | DIN EN ISO 9308-1 | **0** |
| Pseudomonas aeruginosa | KBE/100ml | DIN EN ISO 16266 | **0** |
| Legionella spec. | KBE/100ml | DIN EN ISO 11731-2 | **0** |

BG = Bestimmungsgrenze KBE = Koloniebildende Einheiten

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Teningen, den 19.10.2017

Dipl. Chem. Dr. M. Müller, *Laborleiter*

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Amtsgericht: FR • HRB 260814 USt.-ID-NR: DE 141993679 • St.-Nr. 05077/00947 Geschäftsführer: Dipl.-Chem.Hans Albrich Dr. Michael Müller
DAkkS Deutsche Akkreditierungsstelle D-PL-14433-01-00

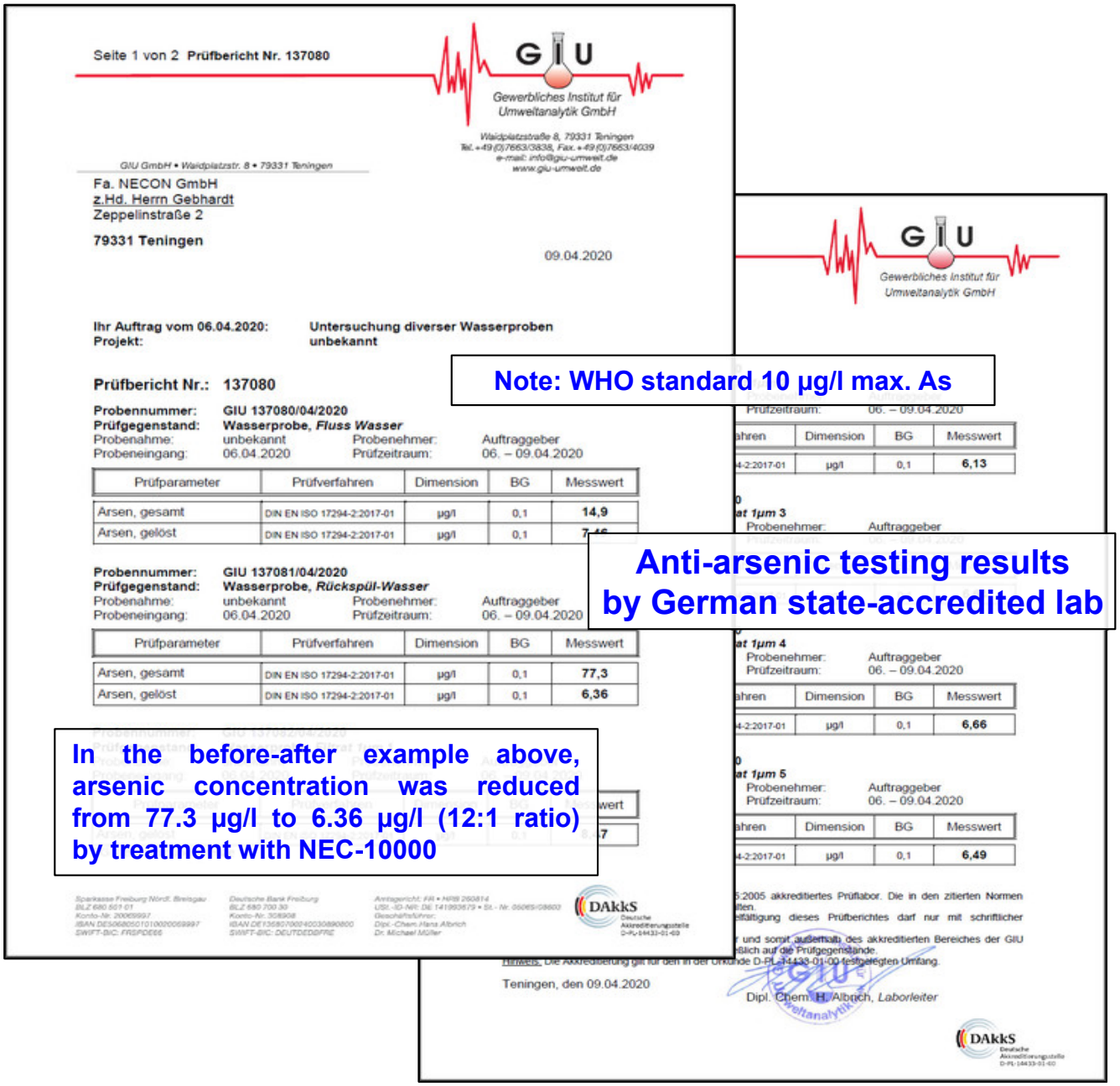
**The added benefit of combining filtration with the NECON process:**

The water **remains perfectly drinkable** (bacteria-free and safe for human consumption).
Even in situation where it is not immediately consumed but stored.

# NEC-10000

**New – added removal of arsenic pollution:**

The same familiar NECON systems as those already on the market for disinfection may simply be fitted with anti-arsenic electrodes instead of those for control of harmful microorganisms.

Seite 1 von 2 **Prüfbericht Nr. 137080**

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**79331 Teningen**

09.04.2020

**Ihr Auftrag vom 06.04.2020:** **Untersuchung diverser Wasserproben**
**Projekt:** **unbekannt**

**Prüfbericht Nr.: 137080**

**Probennummer:** **GIU 137080/04/2020**
**Prüfgegenstand:** **Wasserprobe, *Fluss Wasser***
Probenahme: unbekannt Probenehmer: Auftraggeber
Probeneingang: 06.04.2020 Prüfzeitraum: 06. – 09.04.2020

| Prüfparameter | Prüfverfahren | Dimension | BG | Messwert |
|---|---|---|---|---|
| Arsen, gesamt | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 14,9 |
| Arsen, gelöst | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 7,46 |

**Probennummer:** **GIU 137081/04/2020**
**Prüfgegenstand:** **Wasserprobe, *Rückspül-Wasser***
Probenahme: unbekannt Probenehmer: Auftraggeber
Probeneingang: 06.04.2020 Prüfzeitraum: 06. – 09.04.2020

| Prüfparameter | Prüfverfahren | Dimension | BG | Messwert |
|---|---|---|---|---|
| Arsen, gesamt | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 77,3 |
| Arsen, gelöst | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 6,36 |

DAkkS Deutsche Akkreditierungsstelle D-PL-14433-01-00

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| Prüfparameter | Prüfverfahren | Dimension | BG | Messwert |
|---|---|---|---|---|
| Arsen, gesamt | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 6,13 |

**Probenahme 1µm 3**
Probenehmer: Auftraggeber
Prüfzeitraum: 06. – 09.04.2020

| Prüfparameter | Prüfverfahren | Dimension | BG | Messwert |
|---|---|---|---|---|
| Arsen, gesamt | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 6,66 |

**Probenahme 1µm 4**
Probenehmer: Auftraggeber
Prüfzeitraum: 06. – 09.04.2020

| Prüfparameter | Prüfverfahren | Dimension | BG | Messwert |
|---|---|---|---|---|
| Arsen, gesamt | DIN EN ISO 17294-2:2017-01 | µg/l | 0,1 | 6,49 |

**Probenahme 1µm 5**
Probenehmer: Auftraggeber
Prüfzeitraum: 06. – 09.04.2020

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Teningen, den 09.04.2020

Dipl. Chem. H. Albrich, *Laborleiter*

DAkkS Deutsche Akkreditierungsstelle D-PL-14433-01-00

**Note: WHO standard 10 µg/l max. As**

**Anti-arsenic testing results by German state-accredited lab**

**In the before-after example above, arsenic concentration was reduced from 77.3 µg/l to 6.36 µg/l (12:1 ratio) by treatment with NEC-10000**

# NEC-10000

## P & I Overview:

Suction hose + strainers

IN (2" inner thread)

Pump (when integrated)

Arsenic detox electrolysis

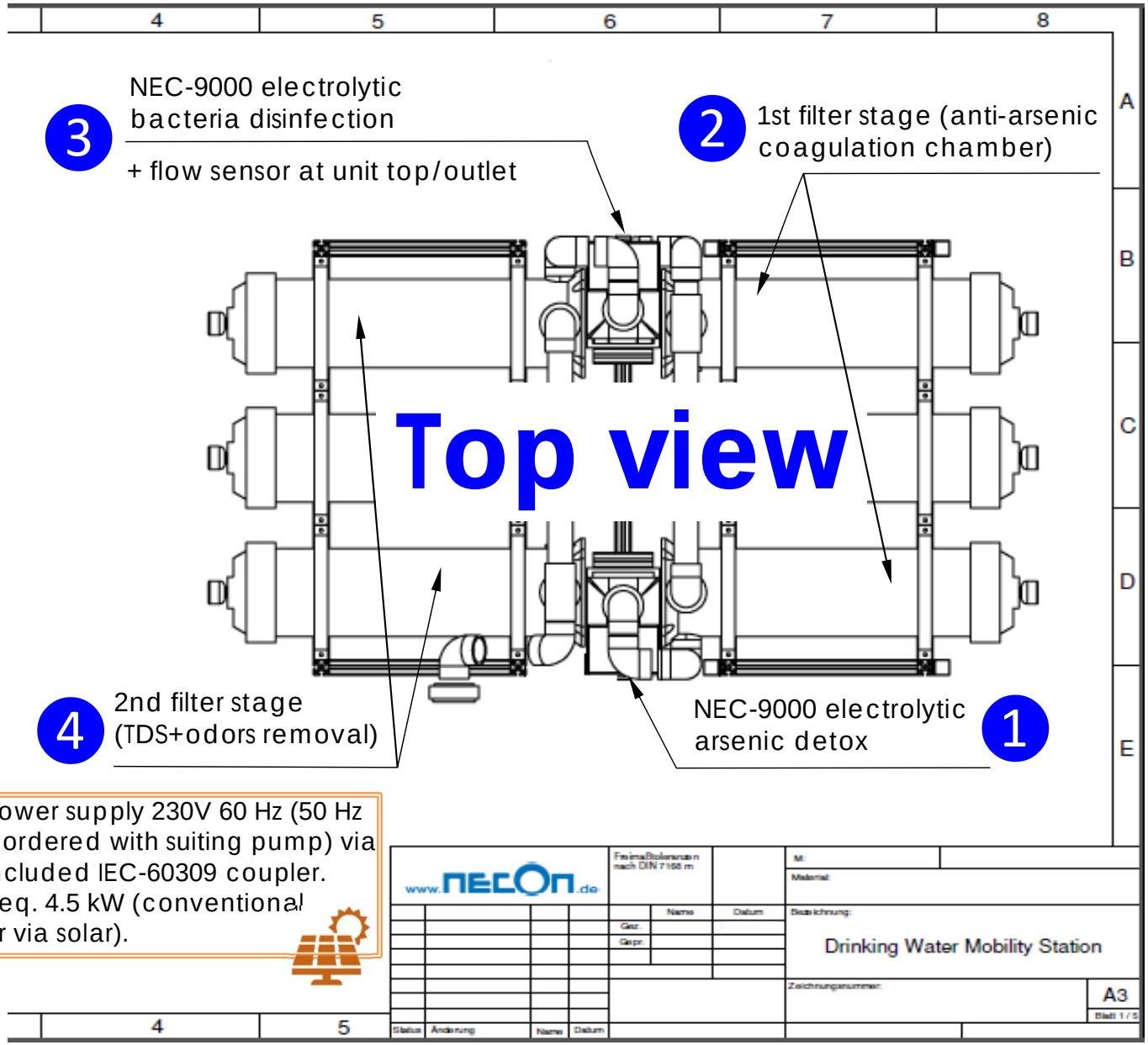
1st filter stage

Disinfection electrolysis

2nd filter stage

OUT (2" outer thread)

Fitting to 60/63mm supply hose



# NEC-4000 mobile

## Technical Data

1. Dimensions (W × H × D):
   950 incl. sediment purge valve/pipe × max. 1300 depending on pump height × 900 mm
2. Weight: approx. 50 kg. -- Weight and further specifications of the electrode cartridge built into the NEC-4000 unit and of included test kit: cf. NEC-4000 model table
3. Flow range: min. 3 up to 8 m3/h
4. Supply power:230 VAC 50~60 Hz
5. Power consumption (of standard integrated pump plus NEC-4000 unit): max. 1.2 kW
6. Suction strainer to prevent intake of floating debris (enclosed separately): as per client requirement depending on specifications of hose intended for water uptake
7. Inlet (of standard integrated pump): 1-1/2"
8. Centrifugal filtration stage #01: for filtering sediment that is heavier than water; manual backwash (requires 15 liters flushing water)
9. Fine particles filtration stage #02: preinstalled container for 20" filter cartridge; cartridges in various pore sizes available at extra cost for factory preinstallation; alternatively integration of carbon filtration for treatment of water against bad odors.
10. Outlet: standard integrated 1-1/2" PVC handle valve to regulate pump performance
11. Cart material, tires: steel-tubing; pneumatic-tired, alternatively fitted with tri-star stair climber at extra cost

## Hand-hauled “Komplett-Technik” on two-wheeler

**"NEC-4000 mobile"**
**is designed as a hand-carried water treatment system for transport, setup and operation by a single person, for filtration and disinfection of service or drinking water.**

Due to the low space requirement, the system can be set up practically anywhere and can be moved just as flexibly between different locations.

**With its integrated pump, the system is expressly designed for intake of water from collector basins and surface waters.**

The water is then processed through two separate filter stages and finally treated with the NECON residual effect, for prolonged prevention of pathogen bacteria.

# NEC-4000
# NEC-7000
# NEC-9000

## Technical data

1. Voltage supply
   88~264 VAC 47~63 Hz (NEC-4/7000),
   90~280 VAC 45~65 Hz (NEC-9000)
2. Electrode current adjustable
   0.5 to 12.0 A (NEC-4/7000) or 30.0 A (NEC- 9000) with max. output 23 VDC (NEC- 4/7000), 48 VDC (NEC-9000)
3. Power consumption
   max. 322 Watt (NEC-4/7000),
   max. 1600 Watt (NEC-9000)
4. Dimensions (W × H × D)
   200 × 365 × 275 mm (NEC-4000),
   200 × 610 × 290 mm (NEC-7/9000)
5. During continuous service 1 switching per day, multiple settable via timer switch
6. Supports flow control (start/stop), optionally proportional control (water volume-dependent performance) in combination with NEC-6000 add-on controller
7. IP protection class 54
8. Metal-cast treatment cell with drinking water-certified coating and 10 bar pressure rating (optionally 16 bar)
9. Connection threads 2 x 2" BSP female


NEC-4000 /NEC-9000 front views; NEC-7000 design and sizing equal to NEC-9000

The compact, cost-efficient design integrates control electronics with simplified-to-the-essential functionality and operation, plus single pre-installed sacrificial electrode which is available in various sizes depending on project requirement and budget.

Combining powerful performance with drinking water-certified treatment cells, the units are highly versatile and suitable for treatment of potable, grey and process water as well as of irrigation water applied to greens and crops, notably winegrowing. Further applications include treatment of water used in animal production, and in bathing pools.

Multiple units can be operated simultaneously in one installation and optionally ordered rack-mounted and piped (below photography shows setup example including 6 units of NEC-4000):

| Product variants | Measurement system included | Integrated electrodes | Summary |
|---|---|---|---|
| **NEC-4000.5**<br>– Treatment of flows with 0.5–1.0 ppm: 4.500– 9.000 m³ service life<br>– For private pools up to 60 m³ | Cu-Testkit Comparator | 1 × C 4000.5<br>  <br>5.2 kg | Standard system performance, half-standard electrode lifetime |
| **NEC-4000.9**<br>– Treatment of flows with 0.5–1.0 ppm: 9.000–18.000 m³ service life<br>– For private pool up to 100 m³<br>– For public pool up to 60 m³ | Cu Test kit Comparator | 1 × C 4000.9<br>  <br>9.5 kg | Standard system performance, standard electrode lifetime |
| **NEC-7000.9**<br>– Treatment of flows with 0.5–1.0 ppm: 15.000–30.000 m³ service life<br>– For pool up to 200m³ | Cu Test kit Comparator | 1 × C 9000.9<br>  <br>17.5 kg | Standard system performance, double electrode lifetime |
| **NEC-9000.9**<br>– Treatment of flows with 0.5–1.0 ppm: 15.000–30.000 m³ service life<br>– For pool up to 300m³ | Cu Test kit Comparator | 1 × C 9000.9<br>  <br>17.5 kg | Triple system performance, double electrode lifetime |

# NEC-6000

## Technical data
## Control panel plus
## Add-in boards

1. Voltage supply 110–240 V full-range 50/60 Hz
2. Power consumption 60 Watts
3. Dimensions (W × H × D)
   335 × 270 × 150 mm
4. IP protection class 54
5. Centralized control for up to 16 units of NEC-4000, NEC-7000, or NEC-9000
6. Max. cable connection length between NEC-6000 and NEC-4000, NEC-7000, or NEC- 9000 unit(s) 25 m
7. Optional add-on board to monitor operation via Modbus protocol (RS485, RTU mode)
8. Optional add-on board for automated flow-dependent amperage control; specifications for supported meters:
   - Pulse output min 300 CPM eq. 5 Hz (pulses per second), max 180 000 CPM eq. 3 000 Hz
   - NPN wiring interface
   - 5 or 24 VDC power input, unless sensor comes with its own dedicated power supply


**NEC-6000 is an optional add-on controller for NEC-4000 and sister models to provide comfort functions.**

Firstly, NEC-6000 panel allows centralized control of up to 16 electrolysis units.

Furthermore, NEC-6000 may be equipped with special-purpose plug-in boards depending on project requirements.

Currently available are interfaces to…

…Building management systems for complete monitoring of all operation parameters via Modbus protocol (RS485, RTU mode via serial connection)

…Pulse-emitting flow meters to enable flow-dependent ionization performance (automated proportional amperage control depending on variations of flow)

# T-NEC

## Technical data

1. Power supply: External plug-in voltage transformer (included; input 180-240 V ⎓ 50/60 Hz), required output to system 24 V DC, tip of plug to T-NEC device with positive polarity, mind. 1250mA
2. Power consumption 28 watts max.
3. Space requirements in vertical installation (strongly recommended): H = 288 mm, W = 122 mm each incl. the supplied shut-off valves D = 176 mm plus clear depth min. 230 mm to detach control head for electrode maintenance
4. Connection threads 1“ BSP male (included shut-off valves: 1“/1“ BSP female)
5. Feed-through: 3/4“ (DN20)
6. Pressure rating: 16 bar
7. Weight incl. electrode: 4 kg
8. IP rating: IP 54
9. Treatment cell: stainless steel
10. Drinking water qualification acc. to WRAS (UK), DVGW (Germany)


**T-NEC is intended for electro-physical treatment of feed water for control and prevention of bacteria, esp. pathogens like legionella bacteria.**

The system has been designed specifically for application in domestic water supply installations. Designed like a pipe tee, it seamlessly integrates itself into existing pipe networks.

The dosage is controlled fully automatically by a patented, integrated control intelligence and does not require any settings on the part of the user.

# NEC-2000

## Technical data

1. Power supply:
   - Integrated wide-range power supply: 85-264 VAC, output max. 24 VDC
   - Frequency range: 50/60 Hertz
   - Connection to power source via supplied Euro power cable with IEC-60320-C7 ("figure of 8") plug to unit's built-in IEC-60320-C8 socket
2. Power rating: max. 36 Watt depending on preset performance and water conductivity
3. Operating controls:
   - BCD switch for presetting electrode performance in 0.16 A steps (max. 1.5 A)
   - BCD switch for setting electrode runtime (0.5 h to 4 hours; continuous operation)
   - ON/OFF push-button for runtime start and abortion; timer recommended (not included in scope of delivery).
4. IP rating: IP54 (splash-water protection)
5. Dimensions: 200 x 215 x 115 mm
6. Empty weight: 4.2 kg
7. Electrode cartridge: 2.3 kg standard made up of 5 plates each 5 mm
8. Connections: 2x 2-inch BSP internal threads


**NEC-2000 is designed as a compact-size water treatment system for…**

- bathing pools or supply tanks with water volumes of up to 40 cubic meters, as well as for
- flows with rates of up to 3 cubic meters per hour

**Just as its larger sister model, the NEC-4000, the NEC-2000 is characterised by a number of key features…**

- precise control of the electrode performance
- high output voltage to the electrode
- rated for water pressures up to 16 bar
- WRAS-certified (i.e. drinking water suitable) coating of the treatment cell

# Treatment cells and electrodes for the swimming pool systems of the NEC-5000 model range

## Doublesize-Combi electrode XL – C9000.9

| | |
|---|---|
| Electrode weight: | 17.5 kg |
| Treatment cell: | Double-Size extra large (cast metal, identical with cell of NEC-9000 units) |
| Cell dimensions (H x W x D): | 610 × 185 × 180 mm |
| Connector thread: | 2× 2“ female thread |
| Cell pressure resistance: | 16 bar |
| Cell temperature resistance: | 70 Grad Celsius |


Figure on the following pages:


## Maxi-Combi electrode – C21035
## (Maxi-Ag electrode – C21038)

| | |
|---|---|
| Electrode weight: | 8 kg |
| Treatment cell: | Maxi-Size<br>(plastic, optionally cast metal) |
| Cell dimensions (H × W × D): | 340 × 225 × 200 mm |
| Connector thread: | 2× 2“ BSP |
| Cast metal version: | 2× 2“ BSP |
| Blanking plug thread: | – 1× ⅜“ BSP for optional venting valve<br>– 1× ½“ BSP for optional paddle-wheel flow monitor |
| Cell pressure resistance: | 3 bar |
| Cast metal version: | 6 bar |
| Cell temperature resistance: | 70 degrees Celsius |

Figure on the following pages: = C21035 = C21038

## Mini-Combi electrode – C21031
## (Mini-Ag electrode – C21036)

| | |
|---|---|
| Electrode weight: | 1 kg |
| Treatment cell: | Mini-Size<br>(plastic, optionally cast metal) |
| Cell dimensions (H × W × D): | 200 × 115 × 100 mm |
| Connector thread: | 2× 1 ½“ BSP |
| Cast metal version: | 2× 2“ BSP |
| Blanking plug thread: | 1× ½“ BSP for optional paddle-wheel flow monitor |
| Cell pressure resistance: | 3 bar |
| Cast metal version: | 6 bar |
| Cell temperature resistance: | 70 degrees Celsius |

Figure on the following pages: = C21031 = C21036

# NEC-5070

## Technical data
## Control unit

1. Voltage supply 110–230 V switchable 50/60 Hz; contact rating filter pump max. 1.1 kW, can be replaced by optional external contactor
2. Electrode current 1–7 A adjustable for the primary electrode(s) and 0.25–2.5 A for the optional auxiliary electrode (in 0.25 A steps); with max. 15 V output voltage
3. Power consumption max. 370 Watts
4. Dimensions (W × H × D) 335 × 265 × 150 mm
5. Up to 3 programmable switching times per day
6. Flow control by automatic filter-backwash control unit, paddle-wheel flow monitor or magnetic-inductive flow monitor for volume flow-dependant water treatment (each optionally available)
7. Heating control adjustable to 40 °C
8. IP protection class 54


The NEC-5000 systems' main feature, aside from the NECON-typical combination of precise amperage and time-controlled electrolysis, is the possibility of operating a swimming pool circulation pump including support for automated filter backwash.

Depending on the size of the bath, the NEC-5000 series controller models are combined with electrodes respectively treatment cells of different sizes (see table below).

Starting model year 2019, the NEC-5000 series controller models are standard equipped with a touch screen, for even more convenient and transparent operation.

The user interface can be switched to different languages and further features a history protocol for detailed examination of past system messages and parameter adjustments.
Via the optional LAN interface, the controller can be operated in a desktop web browser window; in addition, the operating log may be saved for further use.

The most popular feature of the NEC-5070 model compared to its sister model NEC-5010, is the ability to control the pool water temperature.
Furthermore, in addition to the electrode control circuit for the various main electrodes, a second circuit allows dedicated operation of an optional "auxiliary" electrode (#C21036, for individual control of the copper and silver ratio).

| Product variants | Measurement system included | Treatment electrodes |
|---|---|---|
| **NEC-5070.1**<br>– For private indoor pools up to 40 m³<br>– For private outdoor pools up to 30 m³ | Cu-test kit Comparator | 1 × C21031 (+ optional 1 × C21036)<br>  |
| **NEC-5070.2**<br>– For private pools up to 80 m³<br>– For public pools up to 50 m³ | Cu-test kit Comparator | 1 × C21035 (+ optional 1 × C21036)<br>  |
| **NEC-5070.4**<br>– For private pools up to 160 m³<br>– For public pools up to 100 m³ | Cu-test kit Comparator | 1 × C90009 (+ optional 1 × C21036)<br>  |
| **NEC-5070.5**<br>– For private pools up to 320 m³<br>– For public pools up to 250 m³ | Cu-test kit Comparator | 2 × C90009 (+ optional 1 × C21036)<br>  |

# NEC-5010

## Technical data
## Control unit

1. Voltage supply 110–230 V switchable 50/60 Hz; contact rating filter pump max.1.1 kW, can be replaced by optional external contactor
2. Electrode current 1–7 A adjustable; with max. 15 V output voltage
3. Power consumption max. 370 Watts
4. Dimensions (W × H × D) 335 × 265 × 150 mm
5. Up to 3 programmable switching times per day
6. Flow control by automatic filter-backwash control unit, paddle-wheel flow monitor or magnetic-inductive flow monitor for volume flow-dependant water treatment (each optionally available)
7. IP protection class 54


The NEC-5000 systems' main feature, aside from the NECON-typical combination of precise amperage and time-controlled electrolysis, is the possibility of operating a swimming pool circulation pump including support for automated filter backwash.

Depending on the size of the bath, the NEC-5000 series controller models are combined with electrodes respectively treatment cells of different sizes (see table below).

Starting model year 2019, the NEC-5000 series controller models are standard equipped with a touch screen, for even more convenient and transparent operation.

The user interface can be switched to different languages and further features a history protocol for detailed examination of past system messages and parameter adjustments.
Via the optional LAN interface, the controller can be operated in a desktop web browser window; in addition, the operating log may be saved for further use.

| Product variants | Measurement system included | Treatment electrodes |
|---|---|---|
| **NEC-5010.1**<br>– For private indoor pools up to 40 $m^3$<br>– For private outdoor pools up 30 $m^3$ | Cu-test kit Comparator | 1 × C21031  |
| **NEC-5010.2**<br>– For private pools up to 80 $m^3$<br>– For public pools up to 50 $m^3$ | Cu-test kit Comparator | 1 × C21035  |
| **NEC-5010.4**<br>– For private pools up to 160 $m^3$<br>– For public pools up to 100 $m^3$ | Cu-test kit Comparator | 1 × C90009  |
| **NEC-5010.5**<br>– For private pools up to 320 $m^3$<br>– For public pools up to 250 $m^3$ | Cu-test kit Comparator | 2 × C90009  |

# Test kits


## Cu-test kit Comparator

Manual measurement case for rapid determination of copper levels by a colour comparison test.

## Cu-test kit photometer

Manual measurement case for rapid determination of copper levels by a photometric measurement instrument.

## Ag-test kit

Manual measurement case for rapid determination of silver levels by a colour comparison test.

# iOn Testline

Fully automatic, rapid online determination of copper levels at adjustable time intervals by an integrated measurement instrument. The values shown on the display can be transmitted to control units of the NEC-5000 and NEC-8000 types for automatic adjustment to a preset Cu level. For NECON control units with Internet connection all values can be checked remotely, including data records.

Dimensions (control unit) W × H × D:
195 × 180 × 120 mm

# NECON agencies worldwide

# About NECON

NECON GmbH was established in 1981 by Prof. Dr.h.c. Klaus Gebhardt as an engineering company for automation technology and metal construction and is now a global player in the field of chemical-free water purification.

With the aim of developing a safe, economic, human and environmentally friendly alternative to chemical water purification systems, NECON GmbH has collaborated intensively for many years with well-known experts, laboratories and institutes.

The "NECON system" redefines a century-old principle of electrophysical water purification that has now been patented and developed to the series production level.

A broad product range is available for private and public operators for a wide variety of applications.

VORSPRUNG DURCH TECHNOLOGIE

Chemical-free water purification system

made in Germany


Product description, incl. technical specifications, correspond to the state of technology in Germany at last publication time.

Technical or other modifications such as color variations, as well as availability are subject to revisions without prior notice.

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