OxyFree

User Manual

Guldager
Wise Water Treatment

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1. General Information

1.1 The User Manual

This user manual is applicable for an OxyFree plant. Guldager A/S has aimed to provide an adequate survey and thorough information about the operation of this plant. The user manual should be carefully read, before the plant is put into service. Please, note that the appendixes at the rear of this manual give important information about copyright, guarantee etc. as well as safety directions.

Should you have further questions to this manual or the operation of the plant after reading this material, please, do not hesitate to contact us:

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1.2 Technological Background

The presence of oxygen in central heating water will lead to corrosion that may cause complete or partial destruction of the central heating system.

With the installation of an OxyFree protection plant the optimal binding of oxygen is secured. Thus, within a short period of time the oxygen concentration of the central heating water will be below the limit where corrosion may attack. Along with the oxygen binding, an increase of the pH value takes place, stabilising the corrosion preventing process. Now, a protective layer is created on all metal parts connected to the central heating system.
OxyFree is a process, where Electrolysis is integrated in a sub water flow in the return of the system. Thus, water with a high concentration of oxygen will be treated.

The presence of oxygen in the protection container causes a change of the potential between the reference electrode of silver/silver chloride and the container side. In the electronic unit the necessary current is calculated, and a proportional current is connected to the anode of pure aluminium. Thus the container side is brought up to a certain potential, and thus the dissolved oxygen is reduced according to the following chemical reaction:

$O_2 + 2H_2O + 4_e^- = 4\ OH^-$

At the same time, aluminiumhydroxide is dissolved and creates a protective layer on all metal parts in the central heating system. After some weeks of operation, the following changes of the water composition can be noted:

- Oxygen concentration below 0,1 mg/l
- pH-value increase to approx. 9,5
- Reduction of conductivity

2. The Plant

2.1 Normal Application

This plant is intended to eliminate the oxygen content of the water in a central heating system only. Any other application is considered to be non-standard application. Guldager A/S is NOT responsible for damages that may occur as a consequence hereof. See Appendix A.

2.2 Construction

The OxyFree plants consist of a light alloy control panel, with a 5-litre built-in treatment container. In the container an aluminium anode and a reference electrode of silver/silver chloride are built in.

A potential pilot cell installed in the container controls the plant. The cell secures a correct flow and thus correct dissolution of the aluminium anode. The reduction of oxygen is therefore always at an optimum.

The necessary electrical control is integrated. The most important data can be read on the cabinet display, see section 6.5, and with a KatoCard, see more in section 6.3.

2.3 Actuation

Actuation of the OxyFree plant is always to be carried out by Guldager's service technician. He will also programme the control panel according to the existing operation conditions. Further, he will key in the corresponding information about the plant, like e.g. plant number, actuation date, service technician number etc. Finally, the user/s will be instructed.

3. Contents of Delivery

3.1 Contents of Delivery

- 1 electronic control
  - for continuous calculation of the necessary protective current and for connection of a proportional current to the aluminium anode, integrated in an aluminium cabinet, LCD display showing current, voltage, potential and alarm.
- Read out through KatoCard (data and service card)
- Current supply 230 V / 10 A
- Output max. 5 W-80 W
- Density class IP 50
- 1 cabinet of anodized aluminium with fittings containing:
  - Treatment container of steel 37.2 (operating pressure 8 bar, max. temperature 120 °C)
  - Styropor insulation
  - Aluminium anode and reference electrode of silver/silver chloride
  - Accessory equipment (enclosed):
  - 4 coach screws 8 x 50 mm
  - 4 dowels 10 x 50
  - 1 circulation pump for the sub current flow

The contents of delivery may vary according to offer.

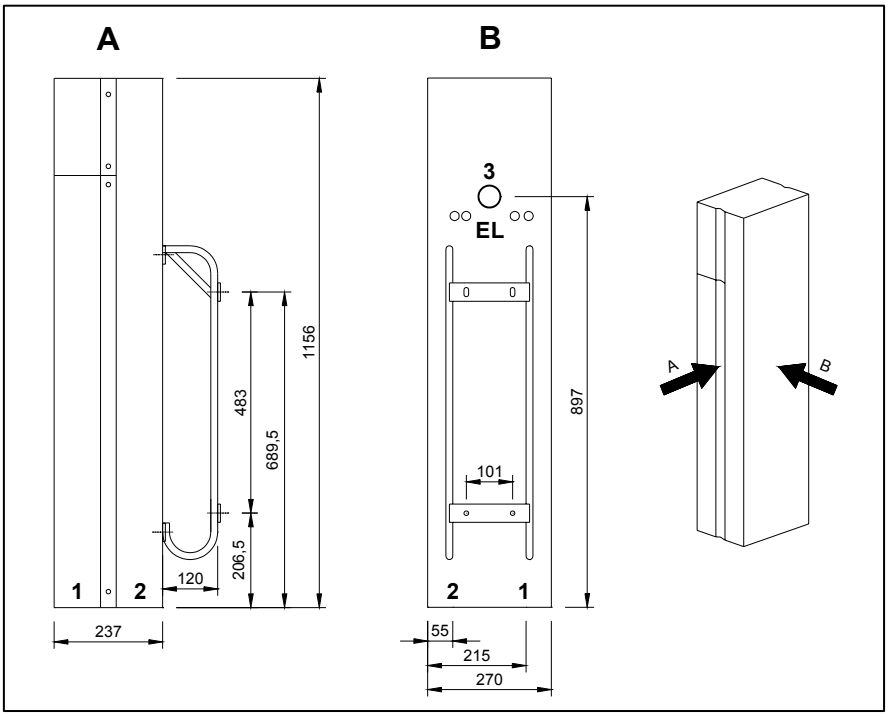
4. Heating Installation

4.1 Installation and Operation Conditions

All work on a central heating installation including the connection of an OxyFree plant, is to be carried out by a professional.

The OxyFree plant must be installed in a dry place providing easy access, in order to enable unhindered service. As to minimum clearance, see more in section 4.2.

4.2 Dimensioned Sketch



Dimensions			Pipe connections		
Width	:	270 mm	Inlet (1)	:	½”
Hight	:	1160 mm	Outlet (3)	:	½”
Depth	:	365 mm	Drainage 2)	:	¾”

Minimum clearance

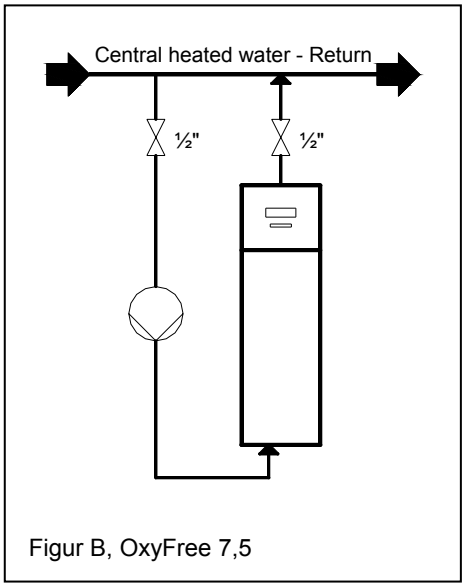
To enable servicing there must be available space around the OxyFree unit:

Top : Min. 300 mm to pipes or ceiling

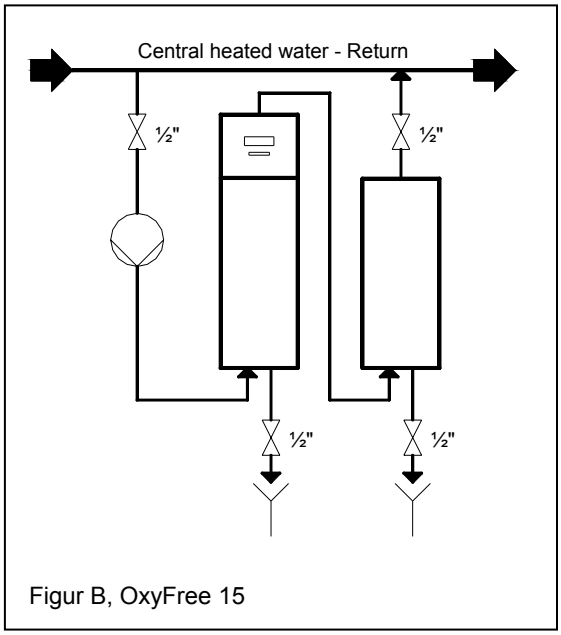
Sides : Min. 100 mm to each side

Bottom : Min. 500 mm to floor

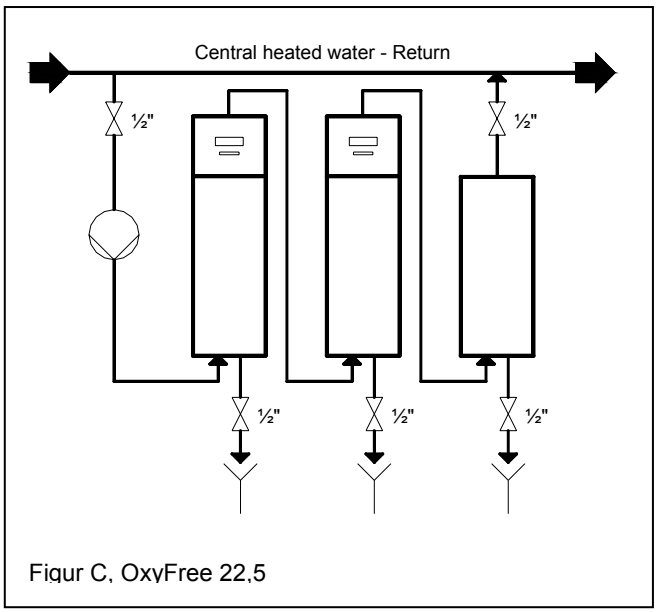
4.3 Installation Examples



Figur B, OxyFree 7,5



Figur B, OxyFree 15



Figur C, OxyFree 22,5

4.4 Connection to Central Heating System

The OxyFree plant is to be installed in a bypass return flow with 2 ½" shut-off valves, (see section 4.3). The circulation pump is also to be installed in bypass supply.

4.5 Standard Installation

1. In accordance with the dimensioned sketch, the OxyFree plant is to be mounted vertically on the wall with the four enclosed fastening screws and dowels, see section 4.2 for minimum clearance.
2. If more cabinets are to be installed in the same system, the distance between them has to be 100 mm due to piping and electrical connections.
3. Then the lower front cabinet is dismounted by removing the two screws in each side plus the four screws at the bottom.
4. Now the connection can be carried out (it is not necessary to dismount the inner container).
5. The inlet for supply and return in the OxyFree unit is to be made with ½" pipes in the bypass return. Before the pump a ball cock should be installed close to the branching as well as the connection to bypass. The circulation pump should be installed at supply.
6. With several cabinets on the same plant, the in- and outlets are to be of relatively equal length. (Only applies to parallel mounted cabinets).
7. The electric installation is to be carried out by an authorized electrician in accordance with the enclosed connection diagram. The OxyFree plant (to contact with separate cutout), and the circulation pump are to be connected according to the VDE-regulations.
8. Power should NOT be connected to the plant. Guldager's service technician does this on actuation. If the plant consists of more groups, the rest of the cabling between the groups is to be carried out by the service technician.

5. Electrical Installation

An authorized electrician should carry out the electrical installation in accordance with the VDE-regulations. The OxyFree plant should be connected to its own 230 V bank.

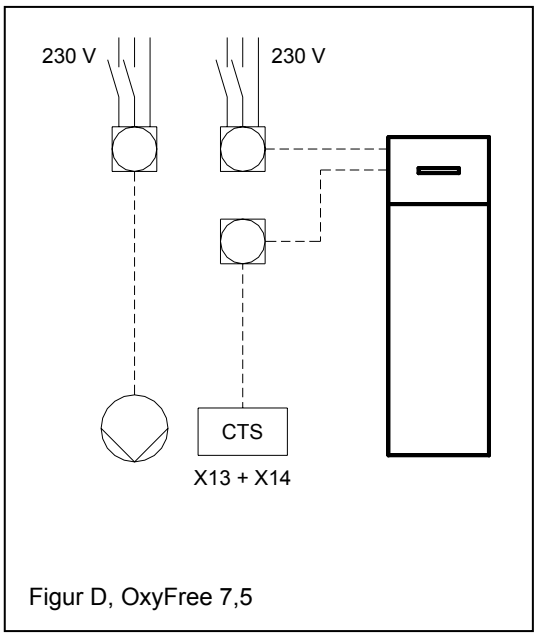
5.1 Electrical Connection

Only Guldagers service technician is allowed to connect power to the plant.

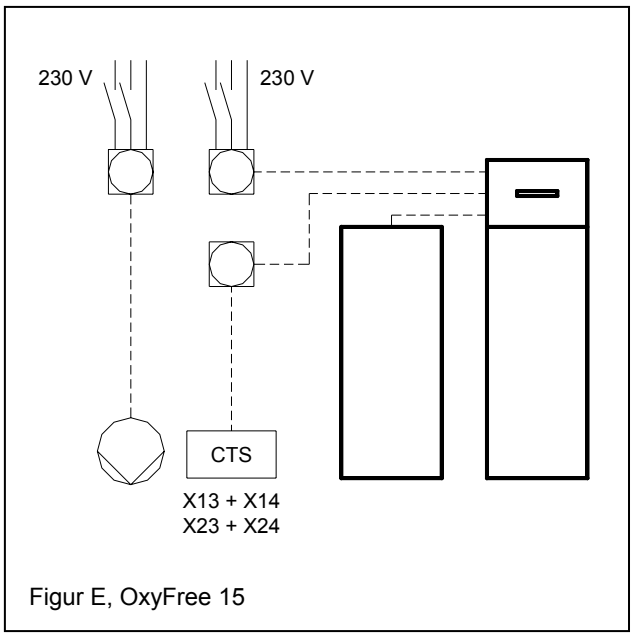
1. The OxyFree plant to be connected to 230 V / 50 Hz.
   - The delivered connecting cable Cu 3 x 1,5 mm² to be connected to its own 230 V / 50 Hz bank with earth and power switch (10 A) before the cabinet.
2. Connection of the impulse water meter via connecting cable Cu 2 x 0,75 mm².
3. Connection of the circulation pump to the impulse water meter.
   - The circulation pump to be connected separately to 230 V / 50 Hz to its own bank with earth and power switch.

The control panel of the OxyFree plant is not to be changed. Guldager's service technician does the necessary cabling and power connection between more units.

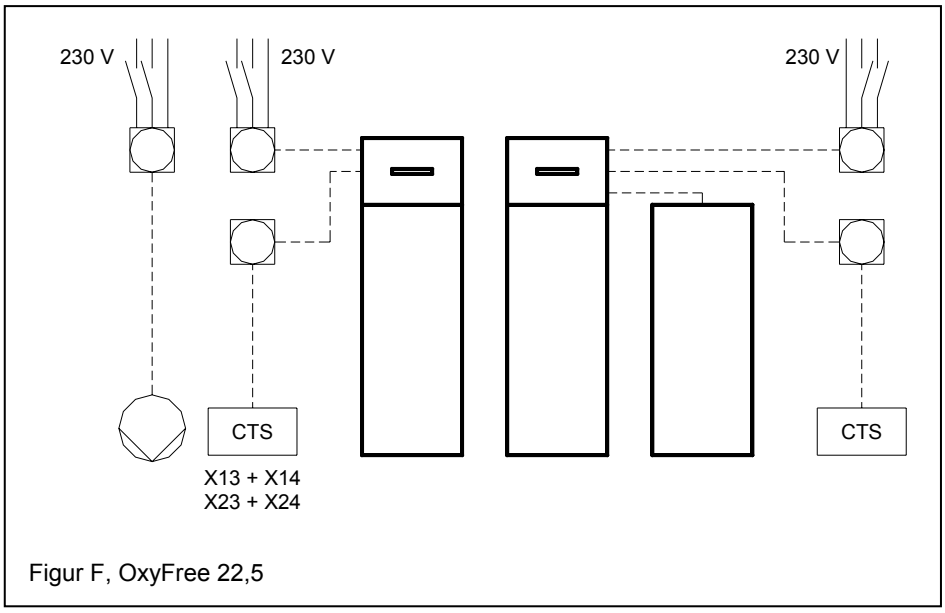
5.2 Connection Diagram - Control Panel



Figur D, OxyFree 7,5



Figur E, OxyFree 15



Figur F, OxyFree 22,5

6. Service and Maintenance

6.1 Inspection, Service, and Maintenance

A yearly service inspection is recommended, where consequently the operation personnel of the plant are to be informed, before the service work begins.

The plant should be kept in clean condition. Please note, that by separation and repair of pressurized equipment, the water and the main electricity switch are to be turned off.

Security Regulations

The OxyFree plant should always be "ON", when the main circulation pump is running. If the main circulation pump stays in operation, this is also due in the summer period. If the main circulation pump is out of operation, the OxyFree plant must be turned off.

Note!

The treatment container is not to be emptied, until the power for the OxyFree plant has been switched off. When the container is open, smoking or use of open fire is NOT allowed.

6.2 CTS-Monitoring

The OxyFree control is prepared for CTS-monitoring (max. load 30 mA, 30 V). With CTS-recording it is possible to centrally monitor and record a possible alarm. For this purpose it is necessary to draw a cable from the CTS-system to the control board of the OxyFree plant, see section 5.2. At least 0,5 m free cable length is needed for the connection to the control board. Guldager's service technician does the cabling.

6.3 KatoCard Service

On the control panel it is possible to slot in a data and service card (KatoCard). Thus, all data are transferred to our data system, and the condition of the plant is controlled.

A KatoCard is forwarded every second month. Soon after receipt of the KatoCard, it is inserted into the slot on the front plate. The display will read "Updating External", and a transfer of all data from the board to the card will take place. Once the text in the display has disappeared, the transfer is complete. This process takes only a few seconds. See more in section 6.5. It is possible to repeat the process by inserting the card again.

6.4 Current Control of the Plant

A Guldager OxyFree plant means an optimal operation and a minimum of maintenance and supervision from the supervisor. The plant must always be in operation and may only be interrupted on prearrangement with Guldager's service technician.

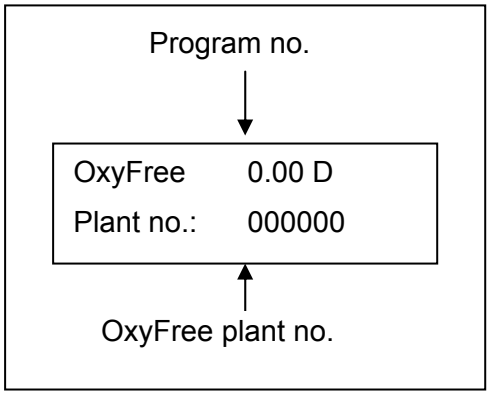
On the front plate of the cabinet, all the plant data are read out in moving sequences on the display. Forwarded at regular intervals, the KatoCard provides Guldager with important information about the OxyFree plant and enables adjustment to ensure continuous protection of the piping system.

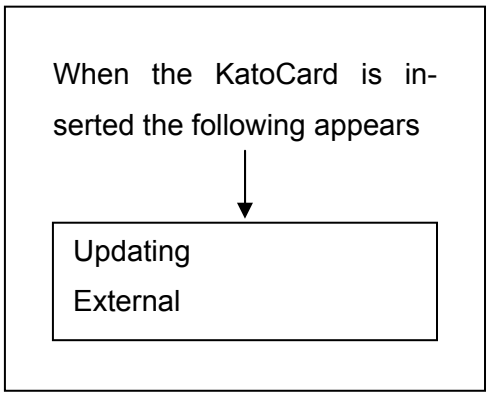
Exceeding the programmed limit values or an error in the power supply will release an alarm. This alarm is seen as a text on the display and in a connected CTS system, if any. You can try to stop the alarm by turning off the 230 V switch before the cabinet and turning it on again after 15-20 seconds. If the alarm does not reappear within a 24 hours, no further action is necessary. However, should the alarm reappear, Guldager is to be informed as soon as possible. It is not necessary to disconnect the cabinet, since the defect banks are disconnected automatically.

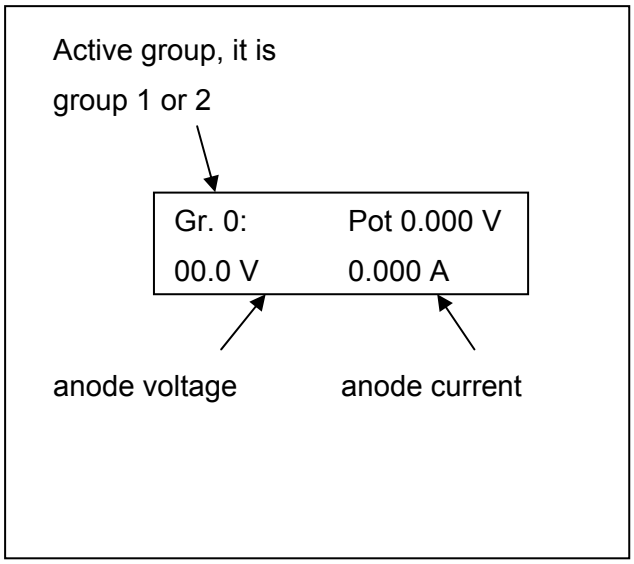
For further information we refer to our fundamental safety instructions, see Appendix B.

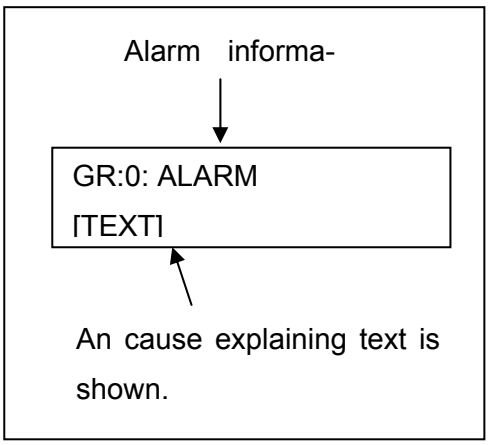
6.5 Reading the Display

On the display the system data are shown in a slowly moving sequence.









The above is subject to technical alteration!

7. Technical Specifications

The data applies for all listed types of OxyFree plants.

Container material	St. 37.2
Container volume	5 l
Container height	500 mm
Operating temperature max.	120 ºC
Operating pressure max.	8 bar
Test pressure	12
Connection supply/return	½ “
Connection outlet	¾ "
Insulation	Styropor
Potential pilot cell/Reference electrode	Yes, Silver/Silver chloride
Number x length aluminium anode	1 x 400 mm
Internal water metre	1 impulse/1 litre
Pump (recommended)	
Manufacture	Grundfos
Type	UPS 25-25
Option:	
CTS	Alarm
External water metre	1 impulse/1 litre
Control	
Display	LCD
Electrical connection	230 V / 50 Hz
Observation possibility	Data card – KatoCard
Dissipation per cell	5 W-80 W
Density class	IP 50
Operation voltage anode	3-12 V

The above is subject to technical alteration!

Appendix A. General Information

Copyright

This user manual is intended solely for buyers of OxyFree plants and their staff. All copyrights belong to the company Guldager A/S.

Replication is allowed for internal use only. This permission applies for the safety directions exclusively. Copying of drawings, diagrams and spare parts lists is NOT allowed.

Guarantee and Responsibility

For a period of 12 months, Guldager A/S guarantees all the mechanical and electrical parts of the system as well as its mechanical construction. This guarantee is valid from the date of transfer. Within this period all parts that cannot be used because of faulty construction, defective material, or defective condition are repaired or replaced.

Guldager A/S cannot be held responsible for damages, caused by the delivery after the transfer:

a. on real property or movables that occur while the delivery is in the buyer's possession.
b. on products, which have been produced by the buyer, or on products, of which these are a part, or for damages on real property or movables, caused by these products as a consequence of the delivery.

In no case the supplier can be held responsible for loss of profits, or other financial consequential losses.

Staff Obligations

Before work is started, anyone, who has been charged with working with this system, is under the obligation to

- observe the basic instructions for working security and the prevention of accidents.
- read Appendix B.
- read the safety regulations and warnings from sub-suppliers of the plant.

Fulfilment of CE-labelling

If Guldager A/S is to have status as producer, this system may only be installed by trained and authorized staff according to the ”purposive use” of the system, in order to meet the demands in the European Parliament and Counsel directive no. 98/37/EF (Machine directive) and directive no. 97/23/EF (Pressurized supporting equipment). Consequently, only Guldager A/S can confirm conformity with the directives in a ”Declaration of Conformity” and place the CE-label for the control purposes of the authorities.

In any other case Guldager A/S is solely producer of ”the original plant", which is to be considered as single components after changes. The responsibility for the plant, including all legal consequences, is thus transferred to the company or installation business that has added the mentioned ”normal application” to the plant. It is important to stress, that a new, complete technical dossier with updated risk estimation, list of components e.a. should be prepared, after changes to the plant have been carried out.

By changes of the construction, use of other components, or safety relevant components, the "Declaration of Conformity" no longer applies.

Appendix B. Fundamental Safety Regulations

Observe the Instructions in the User Manual

In order to be in a position to operate the plant in a correct and safe way, and to make sure that it will work to the utmost without interruption, you must have knowledge of the fundamental safety regulations and instructions.
This appendix lists the most important precautions for a correct and safe handling of the system. This user manual incl. its safety regulations must be observed by anyone, working with or near the plant. Safety regulations – including the company's own – that supplement these rules must also be observed.

The user manual must be stored in visible distance to the area, where the operators control the plant, and safety regulations and warnings must be placed close to the plant on a permanent and visible spot.

The Company's Obligations

The company is under the obligation to let only personnel that meet with the following demands work with and around the system, i.e. personnel that have

- been instructed in the use of the system.
- read this appendix about fundamental safety regulations.

Inspection of the Plant

On demand the employer must take care that the device undergoes a safety inspection. This, however, must be done at least once a year. The inspection is to be carried out by an expert and a report on the inspection results must be written.

An expert is defined as somebody who, based on his professional education and knowledge possesses thorough knowledge of the tool in question and who is familiar with the relevant national occupational safety regulations, regulations for the prevention of accidents, directives, safety and technical rules, which have been generally approved (i.e. DIN norms, VDE rules), to such an extend that he/she is able to estimate the safety condition of the tool. These demands

are met by e.g. the service staff from Guldager A/S and by personnel with corresponding education.

Handling Dangers of the Plant

This plant has been constructed according to the present technological development and the present technical safety rules. In spite of this, by unskilled use, situations that are dangerous to the operator and others, and damages to the plant and other damages on material, may occur.

The plant is only to be used

- for its normal purpose
- in good and safe condition

Defects, which have an influence on safety, must be repaired immediately in a professional correct way.

Remaining Risks

In spite of all technical safety precautions, personal protective equipment, and optimum organizational precautions, damages on material or even personal damages cannot be excluded.

Should, in spite of all safety precautions, an accident occur, Guldager must be informed. In order to minimize potential remaining risks or completely eliminate these through technological progress we aim to react on even the smallest irregularity within the terms of our duty to supervise our products.

Appendix C. Declaration of Conformity

Overensstemmelseserklæring
Konformitätserklärung

I henhold til maskindirektivet 98/37/EØF, Bilag II, A
According to the following directive: Machinery 98/37/EØF, Encl. II, A
gemäß den Richtlinien für Maschinen 98/37 EG, Anlage II, A

Guldager A/S
Hejrevang 1-3
3450 Allerød

erklærer på eget ansvar at følgende produkt
declare, under own responsibility, that the following product:
bestätigt unter Eigenverantwortung, dass das folgende Produkt:

Produkt:	**Katolyse og Elektrolyse**
Type:	**Elektrolyse, Katorack, UniCat, OxyFree og CatoCool**
Styreskab:	**K-skab, Microskab og Standardskab**

(navn, type eller model, parti, portion eller serienummer, eventuelt kilde og antal emner)
(name, type or model, part, batch, or serial number, source, if any, and number of subjects)
(Name, Typenbezeichnung oder Modell, Partie, Portion oder Seriennummer, evtl. Quelle und Stk.anzahl)

som er omfattet af denne erklæring, er i overensstemmelse med følgende standard(er) eller andre normative dokument(er)
which is covered by this declaration, complies with the following standard(s) or other normative document(s)
umfaßt von dieser Konformitätserklärung, in Übereinstimmung mit den folgenden Richtlinien oder anderen normativen Dokumenten ist.

EN 1050, EN 292-1, EN 292-2, EN 292-2/A1, EN 1708-1, EN 418, EN 954-1, EN 60439-1, EN 60204-1
(titel og/eller nummer samt udgivelsesdato for standard eller andre normative dokumenter)
(title and/or number and date of publication of standard or other normative documents)
(Titel und /oder Nummer sowie Erscheinungsdatum für Standards oder andere normativen Dokumente)

i henhold til bestemmelserne i Direktiv: Maskindirektivet (98/37/EØF), Trykbærende udstyr (97/23/EØF), Lavspændingsdirektivet (73/23/EØF) og EMC-direktivet (89/336/EØF)
As stated in the requirements of the following directives: Machinery (98/37/EF), Pressurised Equipment (97/23/EF), Low Voltage Electrical Equipment (73/23/EØF), and EMC (Electromagnetic Compatibility, 89/336/EØF)
gemäß den Bestimmungen der folgenden Richtlinien: Maschinen (98/37/EWG), Druckgeräte (97/23/EWG), elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (73/23/EWG) und die elektromagnetische Verträglichkeit (89/336/EG).

Leverandørerklæringer er indhentet fra vore underleverandører – alle komponenter overholder nedenstående direktiver
Statements from sub-suppliers have been asked for – all components observe the directives mentioned below
Lieferantenerklärungen wurden von unseren Zulieferanten eingeholt – alle Komponente erfüllen die nachfolgenden Direktiven.

73/23/EC, 89/336/EC, 89/392/EC, 97/23/EF
(overensstemmelseserklæring, oversigt over normative dokumenter, direktiver og standarder benyttet til konstruktion af lev. komponenter)
(declaration of conformity, review of normative documents, directives, and standards used for construction of delivered components)
(Konformitätserklärung, Übersicht über normative Dokumente, Direktiven und Standards benutzt zur Konstruktion der gelieferten Komponenten)

Allerød, 23.01.2002 **Per Jensen**

_____

(udstedelsessted og dato) (navn og underskrift eller tilsvarende identifikation af bemyndiget person)
(Place, date) (name, and signature of subscriber)
(Ort, Datum) (Name und Unterschrift des Unterzeichners)

Denne overensstemmelseserklæring følger DS/EN 45 014
This declaration of comformity complies with DS/EN 45 014
Diese Konformitätserklärung befolgt DS/EN 45 014