Operating manual CALDERA

Heating chamber

models: **CALDERA 70, CALDERA 150, CALDERA 200, CALDERA 250, CALDERA 300**

Before using this unit please first read the operating manual!

Version 1.64

Valid from 04.02.2026

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1. SAFETY PRECAUTIONS

1.1. Safety precautions

	**DANGER: This symbol indicates warnings directly related to danger to life or health. They must be followed due to the possibility of electric shock.**

	**The instructions contained in this manual must be strictly followed, especially those with the warning symbol, both for the user's safety and for the proper operation of the unit. The manufacturer is not responsible for any damage resulting from failure to follow the instructions contained in the manual.**

2. NOTES IMPORTANT FOR THE USER

Each user should comply with the company's occupational health and safety regulations as well as the provisions of the Labor Code and read this user manual carefully. The recommendations presented below should be strictly followed - this is to ensure the user's safety as well as long-term and failure-free operation of the unit. Residual risks may occur during operation of the unit..

	**Due to the risk of trapping fingers, be especially careful when closing the door of the unit.**

YOU CAN'T:

	• **touch live parts of the unit** • **operate the unit with wet hands** • **put water vessels on the unit**

- install units outside buildings
- install units in damp or flood-prone places
- install units in the vicinity of volatile and flammable substances
- install units near concentrated acids or corrosive vapors
- store flammable or explosive substances in the unit
- place heavy objects on the unit (maximum permissible load 5 kg)
- cover the units with towels, blankets and other items that may cover the ventilation holes
- enter, sit or climb on the unit
- overload the shelves of the unit (the value of the permissible load on the shelves and the entire unit can be found in the table with technical data)
- store bulk materials
- put liquids at a temperature above the ambient temperature into the unit - heated in another unit
- operate equipment with contaminated gloves/hands
- make modifications and changes to the unit without the written consent of the manufacturer

BELONGS:

	• **use only grounded power sources** • **when disconnecting the plug from the power source, hold its cover (not the cable)** • **disconnect the unit's power source before starting any repairs or maintenance** • **protect the cable and power plug from damage** • **disconnect the power plug before you plan to move the unit**

- arrange the load in such a way as to enable proper air circulation in the unit chamber
- open the door for the shortest possible time (to minimize the temperature fluctuations caused by this)
- always check that the door is closed properly
- turn off the unit and secure it against restarting if it shows visible damage

3. ENVIRONMENTAL PROTECTION AND DISPOSAL OF THE UNIT



The packaging protects the unit from any damage during transportation. The packaging is harmless to the environment and can be recycled. Please dispose the packaging according to the environmental protection regulations or have it recycled. The unit itself can be recycled in order to save the re-sources

The unit is marked according to European Union directives on waste electrical and electronic equipment (WEEE2). This directives determine the return and recycling conditions and are valid in all European Union countries.



Please help us protect the environment!

We would like to inform you that we have taken all the necessary steps to make sure that the unit will meet your requirements and will work reliably. Due to the fact that we constantly improve our products and extend their range, we invite you to provide us with any feedback. All suggestions are welcome! Visit us at: www.pol-eko.com.pl

4. GENERAL INFORMATION

The CALDER heating chamber was designed in accordance with the guidelines of the PN-EN 60601 medical standard. The unit is intended for rapid heating:
• liquids - temperature range from +35°C to +42°C
• blankets, towels, sheets, drapes, etc. - temperature range from +35°C to +70°C

The housing and the interior of the heating chamber are made of stainless steel. Bright, energy-saving chamber lighting with LED diodes and tempered glass in the door enable excellent visibility inside the chamber. The unit can be equipped with telescopic drawers for liquid containers to prevent the contents from falling out, or wire shelves for blankets, towels, sheets, etc. The temperature in the unit is controlled by a microprocessor regulator equipped with an LED display (values visible from a distance of 4 m).

The unit is NOT intended for storing foodstuffs, loose substances not sealed in tight packaging, highly corrosive substances, or substances that may cause flooding of the chamber or explosion. You must also not defrost substances in it.

5. BEFORE THE FIRST USE

The manufacturer sends the unit protected with cardboard profiles and foil. They should be transported in a vertical position and the package should be secured against shifting during transport. Transport and storage conditions are listed on the label on the packaging. There may be slight discoloration on the surface of the unit's stainless steel components. They result from the technologies used in the production of sheet metal in accordance with the guidelines of the PN-EN 10088-2 standard and do not constitute a defect of the unit.



After receiving the parcel, you should visually check its condition in the presence of the courier, because the courier company is responsible for any damage occurring during transport.

The unit is not delivered disinfected.

The installation site of the unit should meet the following conditions:

• recommended ambient temperature from +18°C to +28°C
• recommended* relative ambient air humidity up to 60%
• the unit should be installed in a place where staff can constantly monitor its operation
• the unit is not adapted to work in a heavily dusty environment
• the room should be provided with adequate ventilation for its size
• the unit should be placed on a hard and stable surface (levelled)
• the unit should be placed at a minimum distance of 100 mm from the walls of the room
• the height of the room must be higher than the height of the unit by at least 300 mm
• the unit cannot be exposed to direct sunlight
• the unit should* be placed away from heat sources
• the unit is not suitable for built-in installation
• the installation site of the unit should be equipped with a point with a power socket with parameters appropriate to the unit

Failure to follow the above recommendations may result in deterioration of technical parameters:
• temperature stability,
• temperature uniformity,
• electric energy usage.

Failure to follow the above recommendations may result in damage to the unit.

Failure to follow the installation site recommendations may result in loss of warranty.

The electrical installation intended to power the unit should meet the following conditions.



The unit is designed to be powered by alternating current with a frequency of 50/60Hz and a voltage of 230VAC. The single-phase socket must be grounded.

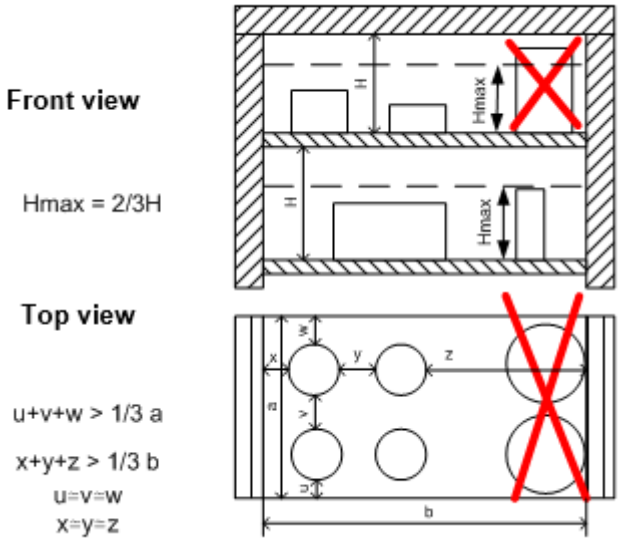
The installation should be protected with a 16A time-delay fuse and a residual current unit..

5.1. Notes on insert placement

To ensure proper air circulation inside the chamber, and thus ensure stable conditions for storing the insert, the following rules should be followed:

• the maximum height of the insert should not exceed 2/3 of the distance between the shelves,
• approximately 1/3 of the width and depth of the shelf should be left empty, and the distances between the inserts and between the insert and the wall should be approximately equal.

The picture below is an example of the placement of samples in the chamber



Following the above recommendations will ensure the most optimal temperature stability and uniformity

6. UNIT DESCRIPTION

Fig. 1. Front view



1 control panel
2 main switch
3 service port
4 nameplate
5 doors with tempered glass

Fig. 2. The interior of the chamber

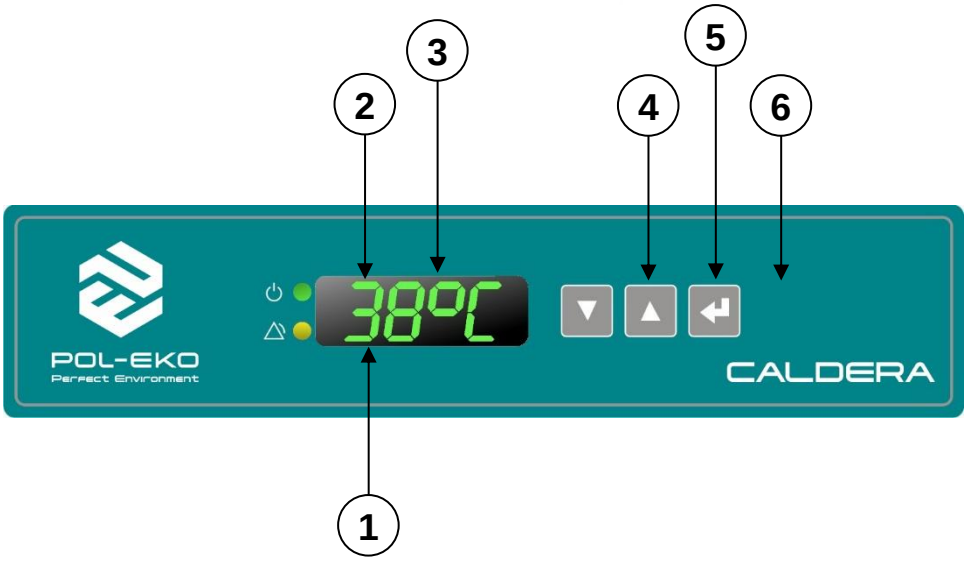


6 LED interior lighting
7 shelf
8 door open sensor

The upper part of the chamber is located fan forcing air circulation.

NOTE: towels are not included units.

6.1. Control panel



1. Alarm (yellow diode)
2. Device power supply (green diode) - when lit, it indicates that the unit is working
3. LED display – displaying the current temperature in the unit or the alarm code
4. ▼ scroll down button, enter User menu
5. ▲ scroll up button, toggle chamber LED light ON/OFF
6. ↵ enter/accept button

7. HOW TO OPERATE THE UNIT

An electronic controller with an LED display and three buttons allows you to select the temperature inside the chamber in the range from 35°C to 42°C (in the case of heating liquids) or from 35°C to 70°C in the case of heating blankets, towels, sheets , etc., with a resolution of 1°C. After turning on, the unit works continuously, maintaining the previously set temperature..

7.1. User instructions

When using the unit, the following rules must be observed:

1. The unit should be operated in accordance with the regulations in force at the plant and the provisions of generally applicable law..
2. Do not operate the unit with contaminated hands or gloves.
3. Only liquids in tightly closed containers should be placed in the chamber.
4. Containers, bags and other packaging used should be dry on the outside.
5. Do not place liquids in the chamber whose temperature may be higher than the temperature set in the unit. Inserting previously heated liquids may mislead the user, who may use liquid at the wrong temperature.
6. It is recommended to refill the entire chamber once every 24 hours. In case of more frequent refilling, the order of adding unheated and removing heated liquids should be established to minimize the risk of using insufficiently heated liquids.
7. Set the temperature in accordance with the recommendations of the fluid manufacturer or the personnel using the unit. If the operating temperatures of the fluids differ, avoid heating them in the same compartment at the same time.
8. Control the retention time of fluids in the chamber so that it is consistent with the manufacturer's recommendations or the recommendations of the personnel using the unit. Apply the rule that liquids inserted earliest are removed first.
9. The user is obliged to monitor the time it takes to reach the appropriate fluid temperature.
10. Before using the fluid, make sure that the fluid temperature is appropriate and consistent with the intended use.

7.2. Start-up

After inserting the plug into the power socket, turn on the switch located at the top of the unit (Fig.2). Programming the operating parameters (setting the temperature) is done on the control panel located at the front, upper part of the unit (Fig. 2).

After turning on, the controller tests peripheral units such as: EEPROM memory, Data Flash memory, RTC real-time clock and temperature sensor. After a positive self-test, the current temperature value in the unit chamber appears on the display.

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7.3. Changing the set temperature

The unit has been factory adjusted and calibrated. Calibration is performed in accordance with the procedures and instructions applicable at the manufacturer's company, using instruments subject to constant metrological supervision..

The temperature value measured by the sensor built inside the unit chamber is displayed on the display. The unit is calibrated in such a way that the value on the display reflects the temperature in the geometric center of the chamber. Temperature in the chamber – temperature displayed on the display while the unit is operating.

Setting the set temperature:

1. When the temperature value in the chamber is displayed, press ▼ - the user menu will show **Uset**,
2. To enter the user menu press promptly ↵ button,
3. The display will show **sp** press ↵ button,
4. With buttons ▼ and ▲ set requested temperature value,
5. With ↵ button approve requested temperature,
6. The unit commences to work at the requested temperature value.

7.4. Setting the temperature alarm

To set the temperature alarm:

1. When the temperature value in the chamber is displayed, press ▼ - the user menu will show **Uset**,
2. To enter the user menu promptly press ↵ button,
3. The display will show **sp** press ▼ button,
4. The display will show **AL** press ↵ button,
5. With buttons ▼ and ▲ choose parameter and press ↵ buton.

In the unit it possible to parameterize temperature alarm with the following parameters:

dtLo – offset of low temperature sets in the range from 1°C to 5°C

dtHI – offset of high temperature sets in the range of from 1°C to 5°C

dEL – delay in minutes sets in the range from 1 to 15 minutes.

With ▼ and ▲ buttons choose the parameters and press ↵, button to confirm.

8. CLEANING AND MAINTENANCE OF THE UNIT

	**Before cleaning the unit, it is necessary to disconnect the unit from the electrical supply!**

- The housing of the unit as well as its interior should be cleaned once a month, unless otherwise provided by company's regulations,
- It is indispensable to carry out disinfection when some liquid is spilt,
- Cleaning – the disinfection of the unit shall be conducted by a professional and trained personnel. Specialist cleaning liquids based on alcohol and chlorine,
- Leave the door open for app. 15 minutes in order to ventilate the chamber,
- During cleaning the unit check the elements of the housing and chamber paying attention to any signs of corrosion and mechanical damage,

Discolorations (stains) may appear on the internal walls of the unit (especially a new one), always made of stainless steel - which are not caused by factory defects, but only by the steel production process..

	**When cleaning the unit with special cleaning agents, it is essential to follow the instructions, recommendations and safety measures included in the instructions for use or in the safety data sheet of the preparation used.**

8.1. Housing cleaning

1.	The housing and door should be cleaned with caution using a soft cloth dampened with water.
2.	Stubborn dirt shall be removed by means of specialist cleaning liquids based on alcohol and chlorine.
3.	Electrical parts shall not get in contact with water or detergents.
4.	Cleaning of the unit may be accompanied with its disinfection.
5.	The user shall prevent the label from getting wet. If the label becomes soaked, it may unstuck.

8.2. Chamber cleaning

1.	Before cleaning the inside of the unit, empty the chamber.
2.	After opening the door of the unit, wait for the chamber to cool down. After removing the drawers/shelves, you can start washing the unit.
3.	To clean the unit, use water or water with a mild detergent.
4.	After cleaning, dry all surfaces thoroughly and reinstall the previously dismantled parts.
5.	When washing, pay special attention to the temperature sensors built in the chamber so as not to damage them.

8.3. Procedure in the event of a longer break in use

1.	Empty the appliance chamber of all items.
2.	Disconnect the unit from the power supply.
3.	Clean and dry the appliance compartment.
4.	To prevent unpleasant odors, leave the chamber door open.
5.	Store at temperatures from 0°C to 50°C.

8.4. Wearing parts

Elementami zużywającymi się podczas normalnej eksploatacji są:

- chamber fan
- door seals
- backup battery located on the electronic controller
- LED interior lighting

9. PROBLEM SITUATIONS

Fault	What to check?	Solution
The unit does not work	Voltage in the socket.	Measure the voltage in the socket. Plug the unit into a different socket, preferably on a different electrical circuit. Call a licensed electrician to check the electrical installation.
	Is the plug properly inserted into the socket?	Connect the unit properly.
	Has the fuse on the back of the unit blown?	Push in the fuse on the back of the unit.
	Is the power cable damaged?	Replace cable.
LED display does not work	-	Turn the unit off and on again. If this does not help, call the service.
The buttons on the panel do not work	-	Turn the unit off and on again. If this does not help, call the service.

If the above-mentioned actions are not effective, please contact the service.

9.1. The yellow alarm LED is on

If the set alarm parameters are exceeded, the yellow LED will light up and a message will be displayed **AlAr**. To read the fault code, press the button ↵. After reading the fault code, press the button again ↵. If there are more faults, read further codes using the buttons ▼ and ▲. If the cause of the fault has disappeared, the alarm will not appear again.

Fault code	Description of the fault
rnG1	The temperature has been exceeded on channel no. 1 - main sensor damage or disruption in taking measurements. Call the technical service if the failure persists.
t1LO	The temperature has not reached the minimum value on the main sensor – the chamber is too cooled. Open the door so that the samples reach ambient temperature.
t1HI	The temperature has exceed the maximum value on the main sensor - the chamber is overheated. Open the door so that the samples cool and reach 40°C.
door	Open door warning - the door is open or the sensor is damaged. Close the door.
t2LO	The temperature has not reached the minimum value on the support sensor – the chamber is too cooled. Open the door so that the samples reach ambient temperature.
t2HI	The temperature has exceed the maximum value on the support sensor - the chamber is overheated. Open the door so that the samples cool and reach 40°C.
rnG2	The temperature has been exceeded on channel no. 2 - support sensor damage or disruption in taking measurements. Call the technical service if the failure persists.
--A1	Driver failure. Call the technical service if the failure persists
--A2	Driver failure. Call the technical service if the failure persists
osc2	Driver failure. Call the technical service if the failure persists
C1C2	Failure of measurement on both sensors. Open the door so that the samples reach ambient temperature.

10. CHECKING THE UNIT

The unit is subject to inspection by the manufacturer's authorized service. The inspection should be performed at least every 12 months. It is recommended to perform a temperature distribution test (BRT) in the unit chamber every 12 months by an accredited laboratory.

11. WARRANTY CONDITIONS

POL-EKO® warrants that this product will be free from defects in material and workmanship for a period of two (2) years from the date of the invoice. In the event of a defect, contact your dealer. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid.

Compliance with local laws and regulations
The user is responsible for obtaining any approvals or authorizations required to launch and use the product. POL-EKO® shall not be liable for any negligence in the above matter except when the refusal to obtain authorization is caused by a product defect.
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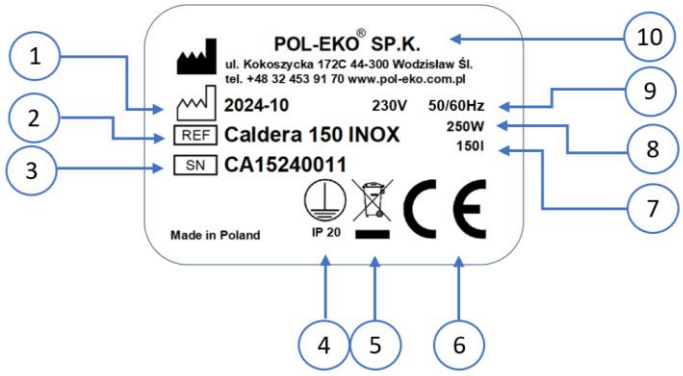
12. RATING PLATE

The rating plate is located on the left wall of the unit, in the upper left corner.



1. date of manufacture
2. type of device
3. serial number
4. degree of protection against electric shock (class I: protection against indirect contact) and IP degree of protection of the housing
5. marking for treatment of used equipment according to the WEEE directive2
6. CE marking, as confirmation of compliance with the directives
7. capacity of the appliance compartment
8. rated power
9. rated voltage and frequency

13. TECHNICAL SPECIFICATION

MODEL / PARAMETR	Caldera 70	Caldera 150	Caldera 200	Caldera 250	Caldera 300
controller	microprocessor with external LCD graphic display				
air circulation	forced				
chamber volume [l]**	70	150	200	250	300
temperature range	35°C ÷ 42°C(in extension 70°C)				
chamber material	stainless steel according to DIN 1.4301				
external dimensions [mm] width x height x depth*	555x640x520	600x857x620	600x1057x620	600x1252x620	600x1455x620
chamber dimensions [mm] width x height x depth	449x410x370	449x658x472	449x858x472	449x1054x472	449x1256x472
rated power [W]	250	250	250	250	250
weight [kg]	50	55	60	71	78
temperature regulation	1°C				
Number of shelves fitted/max	1/4	2/4	3/4	3/6	4/7
Number of drawers fitted/max	1/1	2/2	3/3	3/4	4/4
max load drawers [kg]	20	20	20	20	20
max load unit [kg]	80	40	60	80	80
overheating protection	independent thermostat, thermal fuse				
power supply	AC 230V / 50/60 Hz				

*dims of power cable (50 mm) not included
** volume of air in the unit

The technical data has been provided to tolerance of ± 5%, the capacity of the chamber is always smaller due to the assembled drawers.

14. DECLARATION OF CONFORMITY

DEKLARACJA ZGODNOŚCI UE
EU DECLARATION OF CONFORMITY

POL-EKO

Produkt:	***Product:***
Komora grzewcza Caldera	*Heating chamber Caldera*
Model:	***Model:***
Caldera 70; Caldera 150; Caldera 200; Caldera 250; Caldera 300	
w wersjach:	***in version:***
-	
Nazwa i adres producenta:	***Name and address of the manufacturer:***
POL-EKO A.Polok-Kowalska sp.k. ul. Kokoszycka 172 C 44-300 Wodzisław Śląski Polska/Poland	
Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.	***This declaration of conformity is issued under the sole responsibility of the manufacturer.***
Wymieniony powyżej przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego:	***The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:***
LVD 2014/35/UE EMC 2014/30/UE RoHS 2015/863 WEEE 2012/19/UE	LVD 2014/35/EU EMC 2014/30/EU RoHS 2015/863 WEEE 2012/19/EU
Odniesienia do odnośnych norm zharmonizowanych, które zastosowano lub do innych specyfikacji technicznych, w stosunku, do których deklarowana jest zgodność:	***References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:***
LVD	PN-EN 61010-1:2011 PN-EN 61010-2-010:2020-10 PN-EN 60529:2003/A2:2014-07
EMC	PN-EN IEC 61326-1:2021-10
RoHS	PN-EN IEC 63000:2019-01

W imieniu producenta podpisał:

Małgorzata Szafarczyk
Dyrektor Generalny (CEO)

Wodzisław Śl. 02.01.2023

Manufacturer of control and measurement equipment
for laboratory tests and technological processes,
distributor in Poland of the following companies:
HAMILTON, NICKEL ELECTRO, RODWELL, THERMO SCIENTIFIC, WTW.

We produce:

- thermostatic cabinets
- laboratory refrigerators
- laboratory incubators
- units with photoperiod and phytotron system
- drying ovens and sterilizers
- drying ovens with nitrogen blow
- laboratory freezers
- ultra-low freezers
- climatic chambers
- Caldera fluid and blanket warmers
- colony counters
- laboratory shakers
- stationary samplers
- Hydromat water dispensers
- Eurodrop stations
- FEKO+ waste water receipt station
- heating ovens
- cooled incubators
- fume hoods

We offer portable, laboratory and on-line equipment:

- pH-meters
- ionmeters
- dissolved oxygen meters
- conductivity meters
- photometers and spectrophotometers
- thermo reactors
- turbidity metres
- pH electrodes
- conductivity sensors
- oxygen probes
- heavy metals trace analyzers
- water baths
- autoclaves
- pH buffer solutions
- conductivity standards
- photometric tests
- laboratory accessories
- consumables

We organize:

- regional trainings
- individual trainings
- seminars

We provide:

- warranty and post-warranty service
- consultancy in the selection, maintenance and operation of laboratory equipment

POL-EKO LAB is Accredited by the Polish Centre for Accreditation (a member of ILAC) and provides accredited calibration of:

- thermostatic and climatic chambers (incubators, drying ovens, thermostatic cabinets, climatic chambers, freezers)
- water baths and thermo reactors
- autoclaves
- electric and electronic thermometers
- data loggers
- high temperature laboratory furnaces
- thermohygrometers
- laboratory sieves

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Calibration is confirmed with the issue of 'Calibration Certificate'.

Services outside the scope of accreditation:

- checking equipment for physicochemical measurements (meters and probes),
- carrying out IQ, OQ, PQ qualification procedures,
- mapping of temperature and humidity in the rooms

PN-EN ISO 9001 ISOCERT CERTIFICATE

PN-EN ISO 14001 ISOCERT CERTIFICATE