Made in Germany

RU|MED®
Rubarth Apparate GmbH

Test and Simulation Equipment

for quality control, research and production

Speaker:
Dipl.-Ing. Volker Rubarth

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RU|MED®
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Rubarth Apparate GmbH

Your success is our success!

RU|MED®
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„Made in Laatzen“ – applied all over the world

- 75 Years of experience
- Family business in the 3rd generation
- High quality standards and most advanced manufacturing technology
- Worldwide client base
- Strictest quality control during all phases of production
- Elaborated and safe export packaging

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Environmentally conscious production as a matter of principle

- Eco audit certificate for environmentally conscious production
- The majority of the products consist of stainless steel
- Extreme efficiency, energy saving and optimum recycling of our products

gefördert durch
DBU
Deutsche Bundesstiftung Umwelt

UMWELTFREUNDLICH
R290
Natürliches Kältemittel

RU|MED®
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Certified Quality for a Fair Price

- Optimum quality for a fair price
- Made in Germany
- Certification according to DIN ISO 9001-2015
- QA-notification: Quality assurance for the production of Ex devices
- ATEX Type Examination Certificate for Safety T-Line and X-Line
- Environmental Management System
- Customs Certification (AEO)

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Personal service is one of our top priorities

- „One face to the customer“ – Always the same employee is responsible for you!
- Due to decades of experience, we offer the best consulting to find the solution, which is ideal for you!
- Service partners (worldwide)
- Technical support
- Communication and software
- Calibration and qualification

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Strong in innovations

- Continuous further development of our product range
- Customized solutions by means of 3-D design
- Development of innovations for science and industry

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Customer Reference

IAEA
Bundessortenamt
MERCK
GM Pharmaceuticals
HEIDELBERGCEMENT
MAX-PLANCK-GESELLSCHAFT
AWI ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG
Beiersdorf
Fraunhofer
gsk GlaxoSmithKline
HARIBO
HILTI
Henkel
Radeberger
SBB
syngenta
Leibniz Universität Hannover
LUFA NORD-WEST
BR PETROBRAS
Shell
swatch
TEVA PHARMACEUTICALS LTD
NIH
UHU®
BAM Bundesanstalt für Materialforschung und -prüfung
UNIVERSITÄT HEIDELBERG ZUKUNFT SEIT 1386
BAYER Bayer CropScience
BASF The Chemical Company
NOVARTIS
IIT KANPUR Indian Institute of Technology, Kanpur

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ECO-Line

Precise, extremely reliable, easy to operate and almost vibration-free

2 ECO-LINE

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E 100

E 160

E 230

E 400

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Advantages at a glance:

- Test room volume 100 l to 400 l
- Temperature range 0 °C to +50 °C
- High operating convenience, intuitive handling by means of the Control2015touch
- Vibration-free, energy-efficient cooling by solenoid valve-bypass-technology
- Telescope-like retractable shelves, adjustable in height.
- Possibility of combination with the options light and humidity
- Space-saving construction
- Easy cleaning
- Extremely durable

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Premium-Line of Stainless Steel

Extremely high quality, durable and flexible

3 PREMIUM-LINE

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P 210

P 350

P 530

P 850

PREMIUM-LINE

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P 1060

P 1700

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Advantages at a glance:

- Select from a variety of cabinet sizes in modular design
- Space-saving vertical design
- Optimum economy of space
- Test room volumes from 210 l to 1700 l
- Test room and external housing of corrosion-resistant stainless steel
- Suitable for installation in a clean room, easy cleaning
- Temperature ranges from -30 °C to +80 °C
- High operating convenience, intuitive handling by means of the Control2015 touch
- Eco-friendly refrigerants
- Energy-saving lighting and refrigeration technology
- Noise minimization by speed-controlled compressor fan
- Extremely durable
- Possibility of calibration and validation

3 PREMIUM-LINE

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- Stainless Steel Grid Shelves

- Lockable

- Magnetic Rubber Door Gasket

- Tubular Port

- Recirculating Air Cycle

- Fin Evaporator

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Advantages XXL Cabinet:

- Doors can be opened independently of each other (reduced disturbance of climate)
- Option: Heated glass door for observation of the specimen without disturbance of the climate
- The doors are equipped with a spring in the hinge. So, they are closing automatically, as soon as the aperture angle is < 90 °
- Actuation of the door latch / lock is not required

  Advantage: Hands are kept free for the sample material

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Lifetime costs of ownership:

Comparison of 2 appliances, 850 litres each, with an appliance, 1700 litres

Savings:

- Investment
- Installation
- Qualification
- Monitoring
- Maintenance

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Space Saving

- The width of the doors does not exceed the units' width.

  Advantage: space-saving side-by-side installation.

- Minimum lateral distance to the wall or distance between the appliances

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Transport/Placement

- Components can be removed easily for displacement through doors and placement in lifts

  Advantage:

  - Even lager appliances can be displaced
  - Thus, the components are easily accessible for maintenance tasks

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Installation in a Clean Room

- Integration of the units in a clean room partition wall
- Operation and charging are done from the clean room
- Service and maintenance from outside the clean room

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Optional Accessories:

- Tubular port for hoses, measuring lines etc. are standard
- Test room socket, optionally with program control
- Fresh air supply for animal and plant testing
- Movable design including brakes

- Steering Rollers

- Tubular Port with Closing Plug

- Fresh Air Rosette

- Socket

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CONTROL2015 *touch*

One Control Unit Only

4 CONTROL2015 *touch*

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Easy: Intuitive operation of the clearly arranged 7“ colour touchscreen display.

Good: High-precision sensors and the possibility of adjustment allow highly precise working, which is qualifiable and validatable at any time.

Safe: The documentation by means of the integrated recorder and the logbook ensures transparency, is easy to operate and can be conveniently filed. The optional digital signature provides conformity with 21CFR part 11.

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Intuitive Operation

- Clearly arranged and easy to operate display of the actual values and setpoints of all regulator and control circuits.
- The favourite function for the main page ensures that the user has always an overview of the data, which are important to him.
- Convenient operation with language support in many languages.

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Integrated Screen Recorder

- Recording of actual values of all regulator and control circuits.
- For clearness, all channels can be shown or hidden.
- Past periods can be scrolled conveniently page-by-page.
- Even with power failure, a restricted, battery backed monitoring is effected.

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Calendar

- The calendar function allows quick direct access to past recording periods - no matter if to the recorder, to the logbook or for data export.
- All days, for which data have been recorded, are colour-highlighted.

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Program Control is Standard

- Day, week or process time programs are possible.
- The user can name the programs created by him meaningfully.

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Program Input

- Tabular arrangement of the program input, convenient editing and preview function.
- No limitation of the program steps and of the number of programs.
- Programs can be linked to each other.

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User Login

- In the user management, the preferred language can be assigned to the users. A quick change is possible at any time.
- Thanks to the user management, the activities of each user can be traced exactly.
- In connection with the option Electrical Door Release, even the door opening can be allocated to a user.

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User Management

- The user management can be customized: It can be deactivated completely, or different rights can be allocated to the users.
- Passwords can be restricted in time, and the access can be locked after a defined number of failed login attempts.
- The user management allows the use of the appliance in conformity with 21CFR part 11.

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Logbook

- Gapless event documentation in real time, inseparably connected with the recorded data.
- Filter function for the quick, selective display of the events.
- Free comments with login name are possible at any time.

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Comment Entry

- Complete keyboard for entry of comments into the logbook and for entry of individual names for program creation.
- The assignment of the keys is adapted automatically to the selected language.

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Digital Signature

- Signature of the checked periods directly at the recorder of the control in conformity with 21CFR part 11.
- Undersigned areas are marked correspondingly in the recorder.

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Calibration and Adjustment

- The 5 adjustment points per sensor ensure highest precision.
- If the user has noticed a deviation, he can easily effect a readjustment.
- The tabular entry of the supporting points and correction values can be displayed at any time, thus offering highest transparency.

Adjustment	16.07.2015 16:06:40	admin
Temperature Sensor		
Correction Value 0	°C	0.6
Supporting Point 1	°C	-20.0
Correction Value 1	°C	0.6
Supporting Point 2	°C	0.0
Correction Value 2	°C	0.5
Supporting Point 3	°C	25.0
Correction Value 3	°C	0.4
Supporting Point 4	°C	60.0
Correction Value 4	°C	0.3

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Application Examples

- Life Science
- Food
- Pharma
- Material Science
- Safe Line

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Life Science

- In Vitro Cultivation

- Plant Growth

- Bees

- Arabidopsis

- Protein Crystallization

- Seed Test

- Drosophila Breeding

- Algae Toxicity according to ISO8692

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Food

- Microbiology

- Forcier Test

- Stability Tests

- Photo Stability Tests

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Pharma

- Stability Check according to ICHQ1A

- Photo stability check according to ICHQ1B

- Temperature variation test

- Temperature-conditioned storage in the clean room

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Material Science

- Frost-De-icing Alternation Test

- CDF-Test

- RUN-In-Test

- Burn-In-Test

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Safe Line

- Test of Aerosol Cans

- Temperature-conditioning of Solvents

- Curing of Adhesives

- Paint Drying

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The 4 Environmental Parameters

Temperatur Humidity Light CO_2

ENVIRONMENTAL PARAMETERS

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Application	Type
Temperature	Cooled Incubator
Temperature / Humidity	Climatic Cabinet
Temperature / Humidity / Light / CO_2	Plant Growth Cabinet

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The Temperature

Precise and constant

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Appliance Features:

- Heater with continuous and contactless control for fine dosing
- Recirculating air with defined air conduction through vertical flow channel for optimum temperature distribution in space
- Recirculating air fan with continuous control avoids drying of cultures

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Efficient Refrigeration Technology:

- Precise cooling due to solenoid valve bypass circuit
- Full cooling capacity is available anytime and can be activated on demand
- Fan of the refrigerating machine with speed control for noise reduction
- Partially vibration-free for application protein crystallization
- With frequency-controlled refrigeration compressor more than 50 % energy saving (in test)
- If cooling capacity had not been required for a longer period, the chiller will be switched-off automatically
- Annual tightness test is not required, since the CO2 equivalent is significantly below 5,000 or 10,000 kg

Exemplary calculation for P 1700 (0 °C):

GWP	x Refrigerant	=	CO_2equivalent
3 (GWP)	x 0,2 kg (Refrigerant)	=	0,6 kg
			< 5.000 / 10.000 kg

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Refrigerant Overview:

Unit Type	old			new		
	Refrigerant	GWP-Value	CO_2e	Refrigerant	GWP-Value	CO_2e
ECO	R 134a	1430	257	R 600a	3	0,2
Premium (0°C)	R 134a	1430	1859	R 290	3	0,5
Premium (-30°C)	R 404A	3922	5099	R 290	3	0,6

TEMPERATURE

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Compressor	versus	Peltier
High cooling capacity Independent of the ambient temperature		Rather minor cooling capacity depends on the ambient temperature
Expensive		Low-cost
Low current consumption		High current consumption
Temperature range -30°C bis +80°C		Temperature range +10 °C to +80 °C
Suitable for almost all applications		Universal application is not possible
Running noise of the compressor + fan (RUMED execution is quieter due to output-related speed control of the fan)		Running noise only from the fan, since the fan is required for cooling of the hotter side

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The Humidity

Decisive for the optimum climate

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Advantages of the Ultrasonic Humidification:

- High humidity values with low temperature possible
- Hardly any energy consumption (approx. 45 instead of 1,000 Watts for steam humidification)
- Hardly any heat introduction into the test room, so counter cooling (=dehumidification) is avoided and humidity accuracy is improved
- Immediate availability of humidity on demand. Thus, time-consuming water boiling, such as with vapour, is not required. Hence, the humidity accuracy is improved due to the quick reaction of the humidifier.
- Hardly any water consumption, which results in low formation of condensate. (Solution with canister is possible: rinsing of the humidifier is not required!)

8 HUMIDITY

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- Customer saves installation costs for water and sewage water
- Flexibility concerning installation or later displacement of the unit
- Not every room has a water and sewage water installation (such as basement rooms)
- Condensation of the humidity at a special plate dehumidifier; the water leaves the unit directly through the condensate drain.
- Fully automatic defrosting
- Condensate collecting vessel for manual emptying or condensate evaporation pan
- No installation costs, full flexibility concerning the choice of the location

Ion Exchanger

Canister

Condensate Collecting Pan

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The Lighting

The Right Variant for Every Application

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Lamps

Thermal Insulation with High Luminous Intensity

LED-Light Bars (Level Lighting)

LED-Light Bars (Lateral Lighting)

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Light from Above

- Natural lighting equipment
- Lighting above the test room. Thermal insulation by double glazing for high luminous intensity
- Lighting installed below the test room ceiling for low luminous intensity.
- Disadvantage: only one charging level advisable (shading)

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Lighting in several levels

- Lighting is arranged directly in the test room
- Lighting is removable and adjustable in height
- Thermal insulation is not possible
- Optimum utilization of the test room height for cultures with low growth height
- Different luminous intensities on the individual levels are possible by means of the multi-channel light control

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Light from Both Sides

- Arranged in the test room or thermally insulated by means of a double glazing, if outside the test room.
- Full flexibility concerning the distribution of the shelf height
- High luminous intensities are possible with thermally insulated lighting arranged on the outside

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Special Case „In Vitro Cultivation“

- Special recirculating air system for avoidance of condensation
- No contamination
- No burning glass effect

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CO_2 Gassing

Stimulation of the Photosynthesis

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Increase of the CO_2 concentration for plant growth by controlled gas supply

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Ex-proof Equipment

Safety T and Safety X

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Fuel

Oxygen

Ignition Source

EX-PROOF

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Explosion Zone Gases, Vapours, Fogs (EN 60 079-10)	Unit Category	A dangerous, potentially explosive atmosphere is produced ...	No effective ignition source...
✗ Zone 0	1G	... permanently or long-term (>1000 hours/year)	... during trouble-free operation, just as in case of rare or frequent malfunctions
✓ Zone 1	2G	... occasionally (10-1000 hours/year)	... during trouble-free operation and in case of frequent malfunctions
✓ Zone 2	3G	... only rarely and only short-term (<10 hours/year)	... during trouble-free operation

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✗ Explosion Group I:

Electrical equipment for potentially explosive atmospheres in underground mines, such as mining: pulverised coal, methane gas

✓ Explosion Group II:

Electrical equipment for all explosive areas, except of potentially explosive atmospheres in underground mines, for instance, chemical industry: dyestuffs, acetylene

Temperature Class	Maximum Admissible Surface Temperature of the Equipment	Ignition Temperature of the Combustible Substances
✓ T 1	450 °C	> 450 °C
✓ T 2	300 °C	> 300 °C ≤ 450 °C
✓ T 3	200 °C	> 200 °C ≤ 300 °C
✗ T 4	135 °C	> 135 °C ≤ 200 °C
✗ T 5	100 °C	> 100 °C ≤ 135 °C
✗ T 6	85 °C	> 85 °C ≤ 100 °C

11 EX-PROOF

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Explosion Group	Temperature Class					
	T1 (450 °C)	T2 (300 °C)	T3 (200 °C)	T4 (135 °C)	T5 (100 °C)	T6 (85 °C)
	✓	✓	✓	✗	✗	✗
✓ IIA	Acetone (540 °C) Ethane (515 °C) Propane (470 °C) Toluole (535 °C)	Cyclohexanone (430 °C) i-Amylacetate (380 °C) n-Butane (365 °C) n-Butyl Alcohol (340 °C)	Petrol (220 °C–300 °C) Diesel (220 °C–300 °C) Fuel Oil (220 °C–300 °C n-Hexane (240 °C)	Acetaldehyde (140 °C)	–	–
✓ IIB	City Gas (560 °C)	Ethyl Alcohol (425 °C) Ethylene (425 °C) Ethylene Oxide (440 °C)	Hydrogen Sulphide (270 °C)	Ethyl Ether (180 °C)	–	–
IIC	Hydrogen (560 °C) ✓	Acetylene (305 °C) ✗	–	–	–	Carbon Disulphide (95 °C)

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Safety T-Line:

- Test room approved for zone 1 (1000 hours explosive atmosphere/year in in contrast to zone 2 with only 10 hours/year)
- Powerful refrigerating machine
- Test room with air circulation by explosion-proof recirculating air fan
- Test room in stainless steel, resistant to solvents (no plastic)
- Optionally with humidity as climatic test cabinet

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Safety X-Line:

- Installation in zone 1 environment possible
- In this case, control, electric system and refrigerating machine are ex-proof

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Walk-in Chambers

Environmental Test Chambers in XXL Format

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Advantages at a glance:

- Test room volume up to 40 m³
- Individual dimensions, extremely variable equipment
- Available as temperature chamber, climatic chamber or plant growth chamber
- Intuitive handling by means of the CONTROL2015 touch
- Gapless documentation
- Energy-saving refrigeration technology
- Possibility of calibration and validation
- Optionally available in explosion-proof execution

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Application Examples:

- Stability test according to the ICH Guideline
- Measurement with standard climates
- Plant growth
- Storage of aerosol cans (ex-proof version)

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Seed-Line

Ideally applicable for systematic ISTA compliant seed tests

13 SEED-LINE

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- Soil divider for representative separation of seed samples
- Seed blower for separation of light and heavy seed
- Vacuum seed counter for counting and depositing of seed for germination
- Germinators according to Jacobsen and Rodewald
- Germinators for germination tests
- Thermogradient table for research
- Operation with control unit Control2000

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The Jacobsen Method

- The germination plate is temperature-conditioned by water bath (automatic temperature control)
- Germination spirals, paper wick and paper substrate are placed on the germination plate
- The wick supplies the required humidity and the desired temperature to the paper substrate
- The required air humidity for germination is generated by the transparent germination dome
- A hole in the top of the dome ensures supply of fresh air and minimum evaporation
- Active cooling (optionally) for day/night alternation or any desired temperature profile
- Lighting (optionally)

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The Rodewald Method

- Minor tendency for growth of fungi due to adjustable low humidity
- Particularly suitable for vegetable and forest seed
- The seed is placed on filter paper on the sand in the sand insertion tub
- Humidity transport by wicks in the sand and the capillary effect of the sterilized crystal silica sand
- An acrylic glass hood avoids drying of the sand
- For ventilation, the hood can be opened infinitely variable
- A surrounding channel avoids that condensate drips on the sand

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Soil Divider

- Reliable and representative separation of two samples of the same size
- Easy handling
- Easy cleaning without residues
- Electro-polished surfaces avoid adhering residues
- Completely manufactured from stainless steel

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Seed Blower

- Quick separation of light and heavy seed
- A fan creates a rising, constant air column in the cylinder
- The seed rises in the air column and drops into one of the 3 collection vessels depending on size and weight

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Vacuum Seed Counter

- Simplifies the laborious and time-consuming counting and allows uniform depositing of seed
- Particularly suitable for uniformly sized, smooth seed
- The counter consists of three components:
  - Vacuum system with connecting hose
  - Several counting heads corresponding to the number of seed types
  - Valve for release of the vacuum
- 2 Counting heads included in the delivery

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Qualification & Calibration

Traceability guaranteed

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Model V

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The Process of Equipment Qualification

- Design Qualification **(DQ)**
- Installation Qualification **(IQ)**
- Operation Qualification **(OQ)**
- Performance Qualification **(PQ)**
- Maintenance Qualification **(MQ)**

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Installation Qualification

Documented Evidence:

- The equipment complies with the specifications of the order (DQ)
- Installation at the intended location has been executed correctly
- Interpretation concerning the environmental conditions at the location coincides with the specification of the manufacturer

The following must be documented:

- Medium connections at the installation place (electricity, water, sewage water)
- Environmental conditions (temperature, humidity, distances to walls and ceilings, dust)
- Completeness check of the delivered equipment
- Start-up and operating manual

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Operation Qualification

The operation qualification (OC) serves as documented evidence, that the installed equipment works according to its specifications and under the companies' environmental conditions at the predetermined location.

The verification of the distribution in space is realized by placing the sensors 1 to 4 in the upper corners, sensor 5 in the centre of the unit and the sensors 6 to 9 in the lower 4 corners of the unit.

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Monitoring

The monitoring of the distribution of temperature and humidity is realized by means of 9 sensors, each, with recording of 4 hours, at least.

The sensors must be certified, and they must ensure the traceability to a national standard (DKD, ÖLD, SCS).

YOUR PARTNER IN SENSOR TECHNOLOGY E+E ELEKTRONIK

Kalibrierstelle für Luftfeuchte, Temperatur, Druck und Luftströmung
Calibration Body for Humidity, Temperature, Pressure and Air Flow

akkreditiert durch / *accredited by*
AKKREDITIERUNG AUSTRIA

A 0609

4010
ÖKD
23
012015

Kalibrierschein nach ISO/IEC 17025
Calibration Certificate according to ISO/IEC 17025

ÖKD Kalibrierzeichen / *Calibration mark*

Gegenstand / *Object*	Feuchtegenerator / *Humidity calibrator*
Hersteller / *Manufacturer*	E+E Elektronik
Typ / *Type*	HUMOR 20
Herstellernummer / *Serial number*	S/Nr.: 0706/P41874.113
Auftraggeber / *Customer*	RUMED GmbH Rubarth Apparate GmbH Mergenthalerstr. 8 30880 LAATZEN DEUTSCHLAND
Kalibriernummer / *Order No.*	KA004010
Anzahl der Seiten des Kalibrierscheines / *Number of pages of the certificate*	3
Eingangsdatum / *Date of receipt*	27.01.2015
Datum der Kalibrierung / *Date of calibration*	28.01.2015

Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

Akkreditierung Austria ist Unterzeichner des Multilateralen Übereinkommens der European Cooperation for Accreditation (EA) sowie der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements according to the International system of Units (SI).
The user is obliged to have the object recalibrated at appropriate intervals.

Akkreditierung Austria is signatory to the multilateral agreement of the European Cooperation for Accreditation (EA) and the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen sind unzulässig. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.
This calibration certificate may not be reproduced other than in full. Calibration certificates without signature and seal are not valid.

Österreichischer Kalibrierdienst
Stempel / Seal
Akkreditiert durch / Akkreditierung Austria
E+E ELEKTRONIK Ges.m.b.H.
Langwiesen 7 A-4209 Engerwitzdorf
Telefon ++43/7235/605-0

Datum / Date: 29.01.2015

Zeichnungsberechtigter / *Authorised person*: Dr. Helmut Mitter

Bearbeiter / *Person in charge*: DI Cornel Pop

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LG Linz Fn 165761 t · UST-ID-Nr. ATU44043101 · place of jurisdiction: A-4020 Linz · DVR0962759

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The following must be documented

Test records with measuring results:

All temperature sensors must be within the band of +/-2 °C around the setpoint, the humidity sensors +/-5 % around the setpoint (according to ICH Guideline).

For cooling cabinets, the temperature is allowed to deviate by +/-3 °C. But this can not be realized without recirculating air and glass shelves!

Calibration Certificate RUMED®

Customer: Clariant Produkte (Deutschland) GmbH, Brüningstraße 50, D-65929 Frankfurt am Main

Date of Calibration: 22.01.2018 - 23.01.2018

Place: D-65929 Frankfurt am Main

Test Object: Climatic Test Cabinet Type P1060, SN# 1710/12.4 / (2017)

Characteristic Values of Calibration: Operation at 40°C and 75% rel.Humidity

Used Equipment for Measurement

Recorder	Manufacturer:	RUMED - Rubarth Apparate GmbH, Mergenthalerstr. 8, D-30880 Laatzen	
	Model/Type:	MEKO18, 18 Channel Datalogging system	
	Serial No.:	MEKO200802	
9 x Pt100	Manufacturer:	M K Juchheim GmbH, Moltkestraße 13-31, D-36039 Fulda	
	Type / Model:	Resistance Thermometer Pt100 (4-wire connected), EDES-3-1142	
	Serial No:	Position 1 0041	[2017-D-K-15129-01-00-2017-00]
		Position 2 0042	[2017-D-K-15129-01-00-2017-00]
		Position 3 0043	[2017-D-K-15129-01-00-2017-00]
		Position 4 0044	[2017-D-K-15129-01-00-2017-00]
		Position 5 0045	[2017-D-K-15129-01-00-2017-00]
		Position 6 0046	[2017-D-K-15129-01-00-2017-00]
		Position 7 0047	[2017-D-K-15129-01-00-2017-00]
		Position 8 0048	[2017-D-K-15129-01-00-2017-00]
		Position 9 0049	[2017-D-K-15129-01-00-2017-00]
	Range/Scale:	-50 to 200 °C	
9 x Hygroclip5	Manufacturer:	rotronic ag, Grindelstrasse 6, CH-8303 Bassersdorf	
	Type / Model:	Hygroclip 5	
	Serial No:	Position 1 0087 0492	[7040-ÖKD-23-112017]
		Position 2 0086 0888	[7040-ÖKD-23-112017]
		Position 3 0087 0582	[7040-ÖKD-23-112017]
		Position 4 0087 0528	[7040-ÖKD-23-112017]
		Position 5 0087 0558	[7040-ÖKD-23-112017]
		Position 6 0087 0538	[7040-ÖKD-23-112017]
		Position 7 0087 0538	[7040-ÖKD-23-112017]
		Position 8 0087 0498	[7040-ÖKD-23-112017]
		Position 9 0086 8828	[7040-ÖKD-23-112017]
	Range/Scale:	0 to 100 %r.H.	

Tester: Volker Rubarth, Rubarth Apparate GmbH, Mergenthalerstr. 8, D-30880 Laatzen — Page: 1/20

Calibration Certificate RUMED®

Customer: Clariant Produkte (Deutschland) GmbH, Brüningstraße 50, D-65929 Frankfurt am Main

Date of Calibration: 22.01.2018 - 23.01.2018

Place: D-65929 Frankfurt am Main

Test Object: Climatic Test Cabinet Type P1060, SN# 1710/12.4 / (2017)

Characteristic Values of Calibration: Operation at 40°C and 75% rel.Humidity

Job Instruction for Calibration

The check measurement is subject to the location of the measuring points being mentioned below. A distance of 10 cm from the walls and 10 cm from the ceiling and from the floor is to be kept.
A record of the measurement is to be maintained, stating the sequence of the executed measurements, the time data of the measurements, additional parasitic inductions, environmental conditions etc.
The record is part of the calibration documents being preserved by Messrs. Rubarth Apparate GmbH.
The requirements are met when the deviations are less than or equal to the temperature and humidity ranges being defined by the customer.

Location of Measurement Points:

Position 1, Position 2, Position 3, Position 4, Position 5, Position 6, Position 7, Position 8, Position 9

Tester: Volker Rubarth, Rubarth Apparate GmbH, Mergenthalerstr. 8, D-30880 Laatzen — Page: 2/20

RU|MED®
Rubarth Apparate GmbH

Performance Qualification

The performance qualification (PQ) serves as documented evidence, that the performance of the equipment is constant and corresponds to its specification under real operating conditions (work environment, environmental conditions).

In contrast to the non-recurrent OQ, the verifications of the PQ must be executed at regular intervals. We recommend once a year. A further difference is, that with OQ the measurements are effected in empty condition, whereas with the PQ they are effected in loaded condition.

Thank you very much for your attention

Do you have any questions?

www.rumed.de/en/downloads/vortraege