Laboratory Ultra Low Deep Freezer  
**TC 304-Basic**  
Ideal for long-term storage

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**External Dimensions:**
- **B** = 875 mm
- **D** = 970 mm
- **H** = 1990 mm

**Internal Dimensions:**
- **B** = 630 mm
- **D** = 752 mm
- **H** = 1436 mm

**Capacity:** 690 l

**Storage capacity:** 48,000 cryotubes 2 ml

**Temperature range:** -55°C to -86°C

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**Housing**
Galvanized sheet steel with high quality white coating. Equipped with 4 swivelling castors and 2 levelling adjusters.

**Interior space**
of stainless steel. Cleaning friendly by rounded corners, slippery surface in the interior, meets highest hygiene requirements.

**Insulation**
Vacuum insulation boards (VIP, VACUPOR), combined with high-density PU foam, provide optimum insulation.
Thermal conductivity: < 0.005 W/m/K

**Cooling unit**
Powerful and economical compressors in cascade connection, enable a rapid temperature reduction, <4 hours from 22°C to -86°C! (Maximum ambient temperature 32°C).
Refrigerant: Stage 1: R 417a / Stage 2: R508a / R508b (Optionally with environmentally friendly refrigerant R290 / R170)

**Door**
Door single leaf, including door lock.
With ergonomic handle. A built-in sensor supports the correct closing of the door.
With door frame heating for easier opening of the door. With a unique design, the flexibility of the seal allows a perfect sealing of the freezer and minimizes ice formation.

**Interior fittings**
4 compartments with interior doors to reduce the cooling loss
3 pcs stainless steel shelves (max. load 75 kg per shelf)

**Optional:**
additional shelves
- Pull-out shelf, tilt protected
- Stainless steel frame with drawers
- Stainless steel frame with fixed shelves

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Temperature controller with optical and acoustical alarm

Temperature Range:  
-55°C to -86°C

Temperature accuracy at -80°C +/- 5°C after stabilising

**Indicators et alarms LED**  
The main display allows a clear and visible display of indicators and warning lights. They have a simplified color code to help you easily understand the type of defect:

- **Green:** Normal running  
- **Orange:** minor defect (make the necessary arrangements as soon as possible)  
- **Red:** major defect (make the necessary arrangements immediately)

**Displayed messages:**  
- Power supply  
- Over and under temperature alarm  
- High pressure, compressor 1  
- Battery Level  
- Door open  
- Continuous runtime compressor  
- CO$_2$ injection active

**Battery-backed (24V), allows alarms even in the event of a power failure**  
Temperature controller to adjust the set point at bottom right. Actual value continuously visible

Optional is the freezer equipped with remote alarm contact.

**Energy efficiency**  
The energy consumption is strongly influenced by: the set temperature, the frequency of the door opening, the ambient temperature, etc. The energy consumption is measured realistically. That does not mean when empty, but under real conditions with large numbers of samples. Under these circumstances, for example, the TC 304 model (690 l) consumes 12.5 kWh / 24 h at an ambient temperature of 22 °C.
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Ideal for long-term storage

**Easy to repair and maintain**
- LED indicators provide fast alarm identification (low battery, T ° alarm, ...)
- “Plug & play” electronics
  - Fast exchange of electronic components, without special tools
- Extendable cooling unit
  The cooling unit is mounted on a removable tray. An immediate replacement of the cooling system is possible and can prevent the return of the device to the workshop
- Clogging of the filter causes a decrease in the performance of the freezer or even a stop in the most critical cases. The filter is removable for easy cleaning and maintain a high level of performances

**Defrost**
manually

**Electrical Data**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/50 Hz /single phase</td>
</tr>
<tr>
<td>Power input</td>
<td>1500 W</td>
</tr>
<tr>
<td>Fuse</td>
<td>16 A</td>
</tr>
<tr>
<td>Power cable</td>
<td>1,5 m with schuko plug</td>
</tr>
<tr>
<td>Optional:</td>
<td>230 V/60 Hz or 110V/50/60 Hz.</td>
</tr>
</tbody>
</table>

**Power supply**

- **Power input:** 1500 W
- **Fuse:** 16 A
- **Power cable:** 1,5 m with schuko plug

**Defrost**

- **manually**

**Country of Origin:**

- **European Community**

**Packing details (in wooden box)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>approx. 117x940x215 cm</td>
</tr>
<tr>
<td>Net weight</td>
<td>approx. 330 kg</td>
</tr>
<tr>
<td>Gross weight</td>
<td>approx. 350 kg</td>
</tr>
</tbody>
</table>

**Country of Origin:**

- **European Community**

**Customs clearance code:**

- **8418 4080**
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Special Equipment and Accessories:

Unique safety system BOSS: Maximum protection of your specimens
The samples protection must be efficient in any circumstance, even in unlikely case of low voltage/electronic system outage. The BoSS system compensates for that potential issue and will engage the compressors permanently, maintaining a permanent deep freeze production.

Your great advantage, your specimens will survive!

- The thermostat is equipped with a 24 volt battery. In case of voltage drop of the battery below 20 volts (for example, by failure of the electronic board), the compressor will be permanently connected to the 230 volt supply.
- No emergency-service necessary

GSM Modul
Connecting to the potential-free output. In case of an alarm either a message or a call will be sent automatically. Archiving of 1000 phone numbers is possible. The GSM module is equipped with a rechargeable battery. Automatic alert via SMS when the credit has been used on the SIM card. 6 units can be connected per module. The SIM card is not included

Round Chart recorder
to record temperature, permanently installed in control panel. Comes as standard with battery back-up power supply for continuous operation (mains independent). The replaceable recording discs are suitable for 24 hours or 7 day periods. The actual temperature is plotted with a black felt tip pen on the chart. Internal temperature measurement.
The unit comes with 100 round charts (day or week)

CO₂ Safety system
Includes controller, backup alarm and CO₂ Valve

Independent PT 100 ohms sensor with 4-20 mA signal
Measurement range: -100°C upto +50°C. Output at the back to link with a recorder

Dry contact
(NO&C/NC)

Gloves couple, TC 320-G
Thermal protection Gloves for the ultra low temperature especially for some uses between +70°C and -150°C
Wrist with a tightening stretch on the back, Compliant with the EN420 norm and the CEE/89/86 - EN388 - EN511, Equipment in Class 2 for the individual protection. These gloves doesn't protect against the liquid gas projections.
Size 7 / 10

Several stainless steel frames on request
Wireless data logger, complete
For independent temperature recording

consisting of:

Wireless data logger, SPY RF U1
1-channel for Pt100, 4-20mA / 0-1V / contact on-off, with display
Measurement accuracy at 23°C: +/- 0.3°C
Resolution: 0.1°C
Battery: Lithium - Battery
Recording interval: 1 sec. to 90 minutes
Internal memory: 10,000 measurements
Usable range: 1km LOS
Communication: via radio 868 Mhz
Power: 25 mW
incl. 1 pcs. Sensor of stainless steel, Ø 4.0mm L=30mm
Pt100 class A with plugged cable of PTFE
Measurement area: -200°C…+200°C
Length: 3 meter Optional: 8 meter
Delivery contents: wall mounting holder and plug protection

Software - Basic Version for single user
- Maintenance of multiple Wireless data logger
- Collect the recorded data of the Wireless data logger
- Back up data (tamper-proof)
- Prepare the data in terms of graphics or charts
- Excel exportable
- Maintenance of alarms via potential free contact at the Modem or Alarmsystem (SMS, phone call, blinking light, buzzer)

SPY RF USB-Modem for data transfer to the PC via USB-connector
- Communication with infinite numbers of Wireless data logger
- Remote alarm via integrated potential contact
- Including wall mounting holder

Optional:
Sensor of stainless steel Ø 4.0mm L=30mm Pt100 class A,
with plugged cable of PTFE, Measurement area: -200°C…+200°C, Length: 8 Meter

SPY RF Relay (Repeater)
- Allows the data transfer of the data logger about bigger distances
- Can transfer dates of one or several SPY RF data logger
- Electricity supply about power supply unit and battery in case of power failure
- with 2 output ranges: 25mW to communicate with the data logger and 500mW to communicate with the modem.
- Delivered with wall mounting fixture
- Ambient temperature: from -10°C to +70°C
Qualifications

DQ (Design Qualification)
Definition: Documented proof that the quality-related, GMP-related requirements has been adequately addressed in the design of equipment, including buildings, premises and auxiliary equipment.

The user-requirement profiles (specifications) are documented and confirmed by us. On request, a specification can be created by us.

IQ (Installation Qualification)
Definition: Documented proof that critical equipment and systems have been delivered and installed in accordance with the set requirements and government regulations.

The IQ documentation is worked out by us especially for the delivered machine and is made available to you. The IQ documentation has to be carried out by the customer itself.

OQ (Operational Qualification)
Definition: Documented proof that critical equipment and systems in accordance with the set requirements in the whole operating range are working as intended in accordance with predetermined limits.

The OQ documentation is worked out by us especially for the delivered machine and is made available to you. The OQ documentation has to be carried out by the customer itself.

CQ (Calibration Qualification)
Definition: Documented proof that critical measuring equipment in the intended range in accordance with predetermined tolerances operate reliably under current operating conditions.

Checking the temperature in the cabinet
1 Temperature on 3 different measuring points (measured with calibrated PT 100 sensor) evenly located on the shelves. Inspection time 6 hours, open door after that of 30 seconds. The inside temperature of the cabinet must have been stabilized itself within 1 hour on the set point temperature.

The measurements are carried out in the empty state.
The temperature measures are carried out in our company, represented graphically and provided to you.
The values may not dropping below or above the tolerances given by us.
(Additional measuring points on request)

PQ (Performance-Qualification)
Definition: Documented proof that critical equipment and systems in accordance with the set requirements in the whole workspace under current working conditions (with product) provide the requested services.

The calibration described above is carried out under real conditions on site.
The values may not dropping below or above the tolerances given by us.