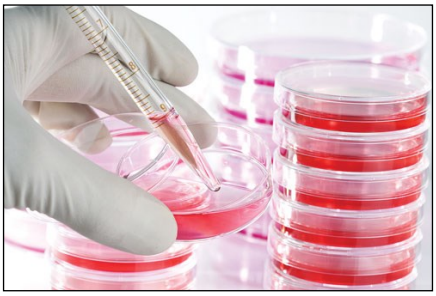
ROTRONIC APPLICATION NOTE

Application note: N°F045

February 2014



CO_2 Incubators

CO2 Incubator

Incubators in general

Today many vaccines are made in cell cultures, such as vaccines for polio, measles, chickenpox and mumps.

Cell culture is the general term used for the removal of cells, tissues or organs from an animal or plant, that is then placed into an artificial environment that optimises their survival or proliferation.

An incubator is a climatic chamber that creates an optimal growth atmosphere for microbiological cultures or cell cultures.

Incubators are used for different applications in universities and research institutes as well as in clinics and hospitals and in the industry.

Why the need to measure relative humidity, temperature and CO_2?

Basic environmental requirements for cells to grow optimally are:

- Temperature control
- Relative humidity control
- CO_2 control

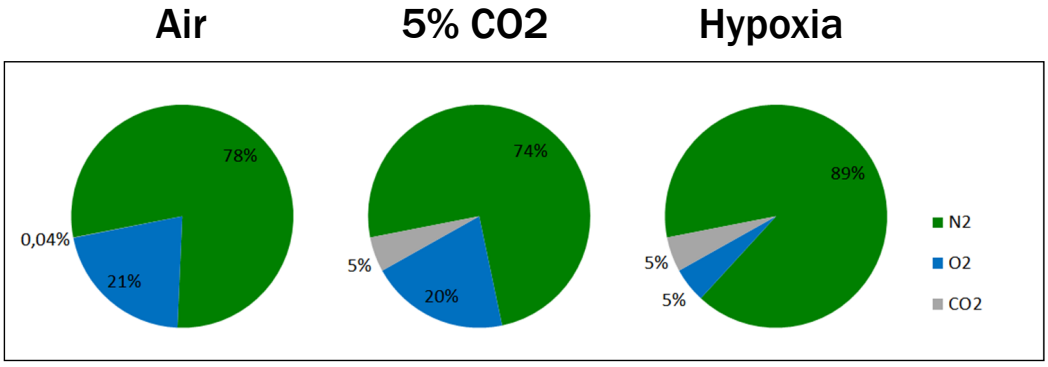
A key element to establish the ideal growth environment is the right pH value. The pH value is controlled with the help of a CO_2 sensitive buffer solution that adapts the pH value accordingly. It is important to control all possible parameters.

A popular means of indicating the pH level is to use a culture media called phenol red. Phenol red allows a constant monitoring of pH based upon its colour: yellow for low pH values; purple for high pH levels and bright red for pH 7.4.

In 95% of applications, the temperature is controlled at 37°C, the relative humidity between 90 and 95% and the CO_2 at 5%. This creates the optimal pH value of 7.4 and allows the perfect growth possibilities.

It is also possible to control the O_2 level in the incubators in order to test hypoxic behaviour in cell culture. Hypoxia is the reduction or lack of oxygen in organs, tissues or cells. This can recreate real life situations such as insufficient blood vessel networks, defective blood vessels and anemia.

Discussed in this edition:



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rotronic MEASUREMENT SOLUTIONS

What solutions can Rotronic offer?

One major advantage that Rotronic can offer today is a complete solution:

- Relative humidity
- Temperature
- CO_2

All sensors for controlling CO_2 incubators are of the highest quality to cover the application ranges that are required!

During the sterilisation phase following each run/cycle, it is possible to either remove the probes from the application or depending on the sterilisation method it could also be possible to leave the relative humidity and temperature probe in the process.

A data logger is also available should a mapping of the chamber be required.

CF5 transmitter

Rotronic products:

Humidity and temperature probes:

- ***HC2-S***
  Standard humidity sensor,
  -50...100°C,
  0…100%rh,
  ±0.8%rh and ±0.1K…
- ***HC2-IM***
  Chrome nickel steel Industrial probe,
  -100...200°C,
  0…100%rh,
  ±0.8%rh and ±0.1K…

Transmitters:

- ***HF5 series***
  For interchangeable humidity probes,
  2 or 3/4 wire configuration,
  Various analogue and digital outputs,
  Display,
  All psychrometic calculations available...
- ***CF5 series***
  0...10% CO_2,
  3/4 wire configuration,
  Various analogue and digital outputs,
  Display.

Dataloggers:

- ***HL-NT range***
  For interchangeable probes (up to 7 probes with docking station also analogue inputs)
  64MB flash card,
  Display,
  Conform to FDA21 CFR Part 11 and GAMP4

HF5 transmitter with a HC2-S probe

HL-NT data logger

Customer benefits:

Accuracy:

Choosing Rotronic gives you the best accuracy on the market.

Precise measurements mean that the chambers can be controlled at optimum conditions.

Communication:

With all these different communication methods, from RS-485, Wireless to Ethernet RJ45, Rotronic can provide the solution for each installation.

Long term stability:

A long term stability with a drift under 1%rh per year (depending on the environment) helps maintain high quality standards for a longer period of time.

Calibration and adjustment:

All of Rotronic products are digital so the whole calibration procedure can be done via a PC, or directly from the device with the help of the Rotronic humidity standards or the 0-calibration unit. Rotronic also offers ISO17025 calibrations.

OEM solutions:

If customers have other requests for their incubators, Rotronic can offer different kinds of OEM modules and configurations. The product required may even already exist.

HC2-IM probe

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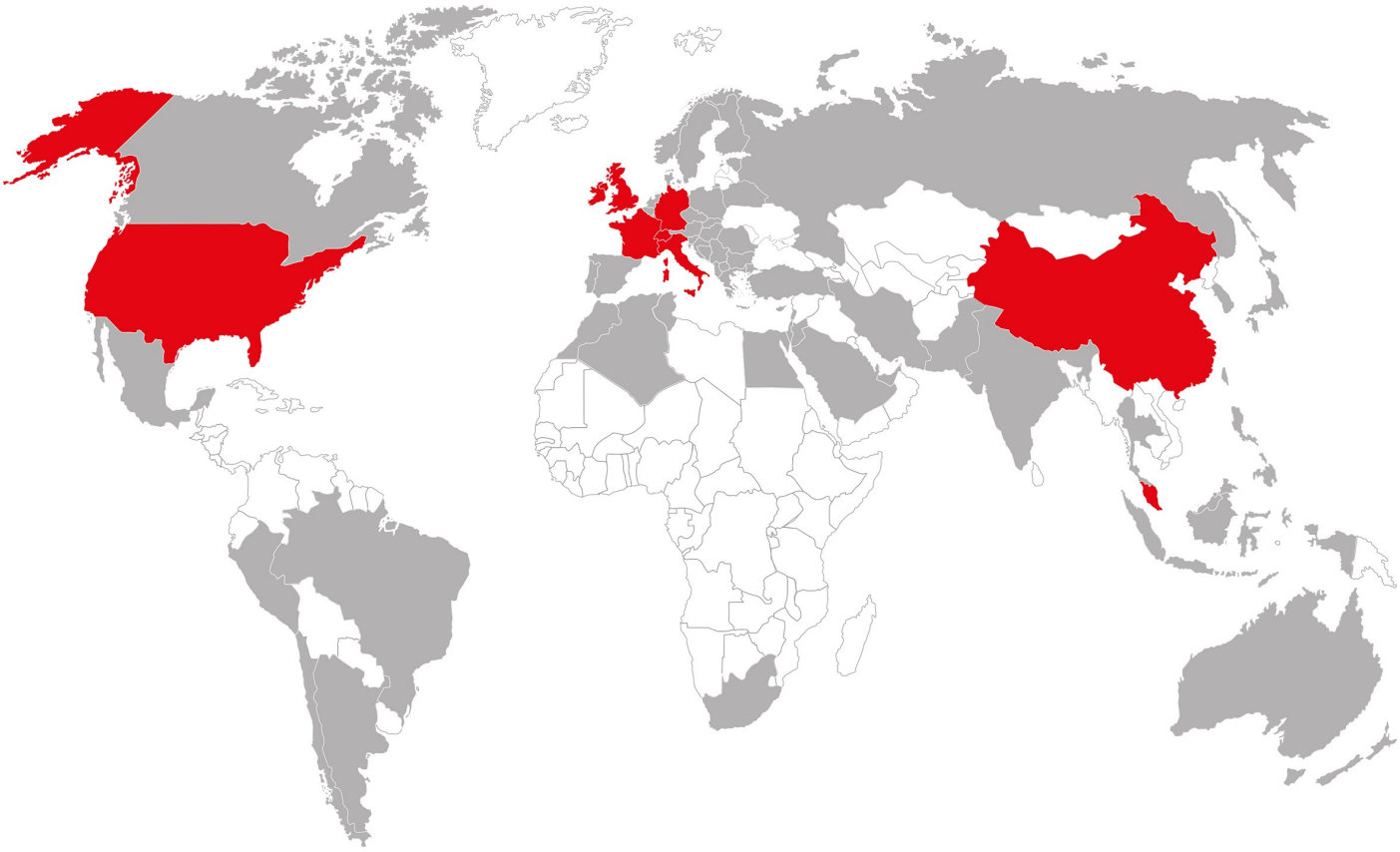
Contact us:

Rotronic is represented in more than 40 countries around the world. An up to date list of all our partners is available at www.rotronic.com/international



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