Fluke Biomedical partners and sales teams, feel free to use parts or all of this content to promote the INCU II Incubator/Radiant Warmer Analyzer, and educate customers about the importance of testing infant incubators and radiant warmers.

Nurturing the Smallest Patients

According to the World Health Organization, every year, nearly 15 million babies worldwide are born prematurely. Complications from early births account for nearly 1 million deaths per year. Around three-quarters of these babies could have been saved with cost-effective care and medical intervention, including warmth, breastfeeding support, and treatment for infections and breathing difficulties.

In 1881, recognizing the special needs of premature infants, Dr. Etienne Stéphane Tarnier introduced a “baby-warming device” at the Paris Maternité. Called a "couveuse," the device created a humid, hygienic environment with a constant temperature, which in the first three years of use, resulted in a 28% decrease in infant mortality.

The challenges faced by Dr. Tarnier are no different today. Premature infants require constant care, in an isolated environment that enables them to thrive and mature. Factors that wouldn’t necessarily effect a full-term baby can be detrimental to a premature infant. For instance, a 0.1 °C or °F drop in body temperature can affect the oxygenation of a fragile infant, potentially leading to brain damage, blindness, and even death.

At minimum, infants that aren’t warm enough will shiver and cry, wasting their energy and strength, and potentially stifling their development. Without immediate and proper intervention, their slowed development could result in longer stays in neonatal intensive care units (NICU), increasing cost-of-care, and additional complications. Infants requiring hospitalization also put an emotional, physical, and financial strain on their families.

For these reasons, premature, and at-risk infants are placed in incubators where they have the best chance of maturing. An incubator maintains humidity balance, offers protection from temperature variations, provides isolation from excess handling, noise, and germs, and helps ensure the administration of consistent oxygen, nourishment, and medications.

However, if an incubator isn’t calibrated correctly or an environmental parameter isn’t stable or consistent, the incubator may provide more harm than good.

Consistency of Incubators

While incubators tend to be very reliable, manufacturers recommend they be tested at least once a year. Facilities such as children's hospitals, which have level 3 NICUs, might test their incubators more often. Routine testing ensures neonatal incubators mask loud noises, maintain a consistent temperature with no hot or cold spots, provide the right amounts of oxygen, and sustain a nourishing relative humidity level. Performing tests and measurement on incubators also validates they adhere to global standards like IEC 60101-2-19, IEC 60601-2-20, and IEC 60601-2-21.
Along with routinely testing incubators in hospitals and birthing centers, it’s necessary to test transportable incubators, which are used for moving fragile infants to facilities with higher levels of neonatal care. These incubators are prone to even more issues because they are battery operated and loaded into ambulances, helicopters, and wheeled throughout facilities.

While most infants don’t need to be placed in an incubator, newborns delivered in hospitals, clinics, and birthing centers are typically placed in radiant warmers to stabilize their body temperature following birth. These devices use radiant heat to warm their tiny patients. Like incubators, they need to be routinely tested to ensure there don’t have temperature variations, verify the accuracy of the skin temperature probe, and ensure all alarms are working correctly.

Traditional methods of testing infant incubators and radiant warmers can be time-consuming, requiring a technician to manually run tests, and then use pen-and-paper to document the results. Along with being error-prone, it is difficult to be consistent and repeatable with this method.

The use of an incubator analyzer enables the testing of environmental parameters – some even test them simultaneously – plus the ability to easily collect data, evaluate the results, and electronically document test data and protocols. In addition, after placing the analyzer in an incubator, and selecting the desired tests and standards, many of today’s analyzers can capture data in an undisturbed environment, freeing up technicians to concentrate on other work.

The Next Evolution: Fluke Biomedical INCU™ II Incubator/Radiant Warmer Analyzer

An increased awareness of the need to routinely test neonatal products, along with rising birth rates and premature births has heightened the need for incubator/radiant warmer analyzers in both developing and developed nations. In addition, municipal healthcare organizations have pushed for more stringent performance standards.

To help meet these needs, Fluke Biomedical introduced the INCU II Incubator/Radiant Warmer Analyzer. Portable and easy-to-use, the INCU II is an all-in-one-solution that complies with IEC 60601-2-19, 60601-2-20, and 60601-2-21 standards.

Everything biomedical technicians need to test infant incubators and portable incubators are stored in the compact 3-pound (1.4 kg) unit, including foldable tripods for holding the temperature sensors. An additional case with five temperature pucks for testing radiant warmers is also included.

What distinguishes the INCU II from the earlier version of the INCU Incubator/Radiant Warmer Analyzer is the ability to quickly set up and run the unit, wireless capability, and on-board test automation. Its color-coded probes match their respective ports, and the optional placement pad helps with proper alignment of the five temperature probes around the incubator and/or radiant warmer to help users capture accurate readings in compliance with standards.

The INCU II can simultaneously measure relative humidity, airflow, sound, and temperature at six points using 5 independently movable sensors and one k-type thermocouple. Once an incubator has reached its set temperature and is stable, the INCU II can generally test all of these parameters within 15 minutes. Testing radiant warmers is equally straightforward. Instead of
using the temperature probes, pucks are plugged into the input ports, and then placed around the radiant warmer, according to prescribed standards.

Another new feature is the large, color LCD screen, and an intuitive user interface with built-in standard and customizable test templates that help maximize efficiency. Using the on-screen prompts, a technician can easily select an IEC standard to test against, or create a test group for the INCU II to automatically complete. Alternatively, users can create unique testing procedures, tailored to a facility’s protocols.

The INCU II displays test results in real-time, and at the end of a standards-based test, either a “pass” or “fail” indicator is displayed for quick and easy troubleshooting. Users can then upload the results to their computer wirelessly or by using an USB cable.

With a 24 hour battery, the INCU II can sustain long-term testing or operate via AC power without disturbing the testing environment. The INCU II has large on-board memory and can store approximately 50 tests, with up to 48 hours of testing per test.

Along with on-board automation, the INCU II uses an Excel plug-in to support collecting, recording, storing, and analyzing test results.

Today’s incubators provide an environment that enable at-risk infants to thrive and develop with carefully controlled heat, humidity, oxygen, and noise. The INCU II Incubator/Radiant Warmer Analyzer is an all-in-one, portable, and easy-to-use analyzer that helps ensure this environment performs as expected, and also meets global standards.

About Fluke Biomedical

*Trusted for the measurements that matter.*

Fluke Biomedical is the premier, global provider of test and measurement equipment and services to the healthcare industry. We serve biomedical engineers, quality-assurance technicians, medical physicists, oncologists and radiation-safety professionals and are continually expanding our range of solutions to a broader range of health and safety professionals. For more information, visit www.flukebiomedical.com.