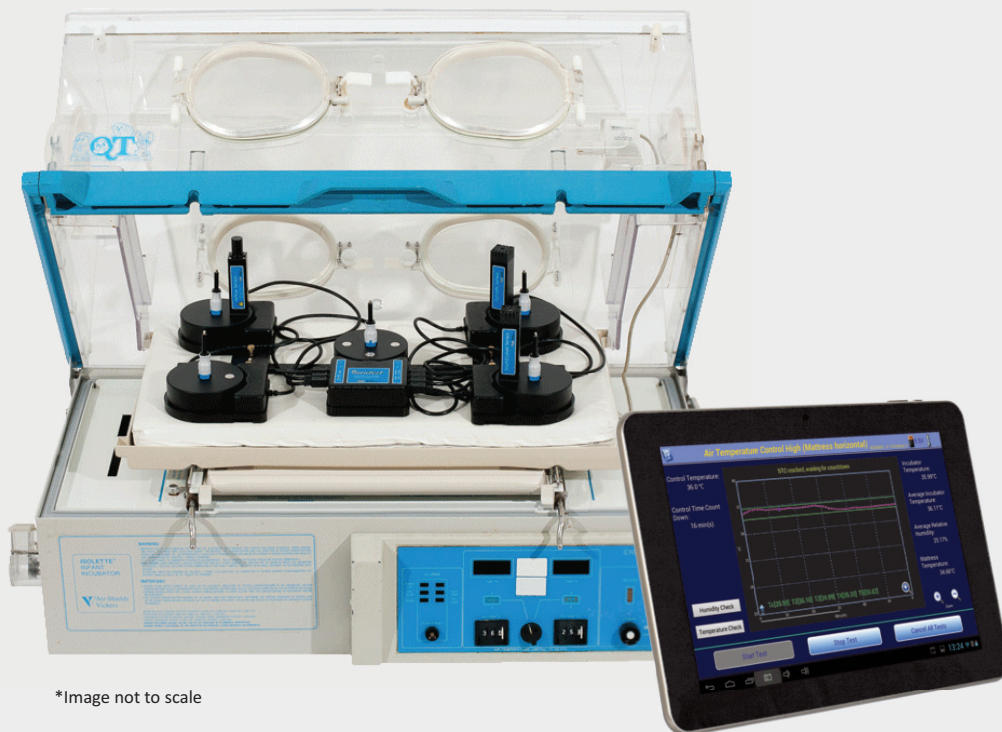# vPad-IN™

Infant Incubator & Radiant Warmer Testing System

Datrend Systems next generation Incubator Tester, vPad-IN, is based on our revolutionary Vision-Pad Technology™. Utilizing the Vision-Pad platform, parameters are sensed inside the incubator environment and results are transmitted wirelessly to a 10" Android tablet for analysis and display. Using wireless control, test parameters and test protocols can be modified without disturbing the equilibrium of the heated environment, thereby minimizing test times.

Key Features:

- Compatible with closed, forced air convection incubators, transport incubators and open, radiant infant warmers (optional)

- Simultaneous measurement of humidity, airflow, sound, and 6 different temperatures

- All sensors are independently movable, to be placed in positions required by the Standard

- Sound level measurements may be taken outside the incubator for external alarm test

- Results can be merged with vPad Electrical Safety Test results and imported into commonly-used CMMS

- Optional precision controlled heater permits testing of body temperature sensor accuracy

vPad-IN was designed to help protect our most precious resource in life — the beginning of a new life itself!

Innovation by design

*Image not to scale

Incutest – Performance Specifications

Temperature:

Measurement Range: 0 °C to 50 °C

Accuracy: T1+/- 0.05 °C

Resolution: 0.01 °C

Convection: 5 "puck" sensors (T1 - T5) - radiant warmer

Air Convection: 5 sensors (alternate "pos" T1 - T5) - incubator

1 Mattress Temperature Sensor

Skin Sensor[2]:   Sensor "oven" with thermal pad contact

28 °C to 40 °C in 2 °C increments

Resolution: 0.01 °C

Accuracy: +/- 0.05 °C

Airflow:

Measurement Range: 0.1 to 1 m/s

Accuracy: +/- 0.1 m/s at 50% RH +/- 15%

Resolution : 0.01 m/s

Sound Level:

Measurement Range: 30 dBA to 100 dBA, Type III

Accuracy: +/- 3 dBA

Resolution: 0.1 dBA

Relative Humidity:

Measurement Range: 0 - 100% Non-condensing

Accuracy: +/- 3% to 100% RH

Resolution: 0.1% RH

Data Retention:

Capacity: up to 48 hours per test

Sample rate: 1/min or 1/sec, automatic, parameter dependent

Test Specifications:

Incubator Testing Specifications

- Measures temperature at 6 points as per IEC 60601-2-19 (sub-clause 201.12.1.101\102)
- Measures airflow at 4 points in the enclosure per IEC 60601-2-19 (sub-clause 201.12.1.111)
- Measures sound level inside the incubator per IEC 60601-2-19 (sub-clause 201.9.6.2.1.101)
- Measures sound level inside the incubator during alarm per IEC 60601-2-19 (sub-clause 201.9.6.2.1.103)
- Measures sound level outside the incubator per IEC 60601-2-19 (sub-clause 201.9.6.2.1.102)
- Measures incubator temperature at center point (A) of incubator as per IEC 60601-2-19 (subclause 201.12.1.102)
- Measures average incubator temperature (AIT) per IEC 60601-2-19 (sub-clause 201.3.202)
- Measures incubator temperature (IT) per IEC 60601-2-19 (sub-clause 201.3.207)
- Measures average temperature (AT) per IEC 60601-2-19 (subclause 201.3.203)
- Measures average temperature at 4 points per IEC 60601-2-19 (sub-clause 201.12.1.102)
- Measures skin temperature sensor accuracy per IEC 60601-2-19 (sub-clause 201.12.1.103)[1]

- Confirms skin temperature sensor control of incubator per IEC 60601-2-19 (sub-clause 201.12.1.104)
- Confirms independent incubator temperature sensor accuracy per IEC 60601-2-19 (sub-clause 201.12.1.105)
- Measures difference between average temperature and control temperature per IEC 60601-2-19 (sub-clause 201.12.1.106)
- Measures actual warm-up time compared to operating manual per IEC 60601-2-19 (sub-clause 201.12.1.107)
- Measures overshoot and recovery to steady state per IEC 60601-2-19 (sub-clause 201.12.1.108)
- Confirms humidity reading per IEC 60601-2-19 (sub-clause 201.12.1.109)

Radiant Warmer Testing Specifications

- Measures skin temperature sensor accuracy per IEC 60601-2-21 (sub-clause 201.12.1.101)[1]
- Measures average warmer temperature at 4 points per IEC 60601-2-21 (sub-clause 201.12.1.102)
- Measures average warmer temperature at center point (A) of incubator as per IEC 60601-2-21(sub-clause 201.12.1.102)
- Confirms skin temperature sensor control of warmer per IEC 60601-2-21 (sub-clause 201.12.1.103)
- Confirms airflow is less than 0.1 m/s per IEC 60601-2-21 (subclause 201.12.1.102)
- Measures sound level on the mattress during alarm per IEC 60601-2-21 (sub-clause 201.9.6.2.1.101)
- Measures sound level in front of the warmer per IEC 60601-2-21 (sub-clause 201.9.6.2.1.101)
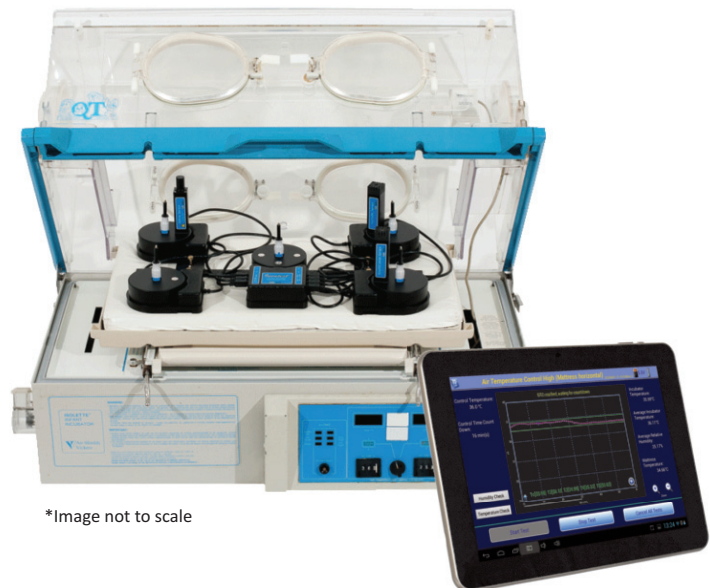
Transport Incubators

Testing carried out in accordance with IEC601-2-20

Utility App

Enables ad-hoc testing of airflow, humidity, sound & temperature

[1] Sensor accuracy heater is an optional accessory

All specifications subject to change without notice.

*Image not to scale

DATREND Systems Inc.

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