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BT-37

April 2011

Benchtops versus “Big-Box” Incubators in IVF

Benchtop incubators embody the following features inherent in their design:

- ❖ Better temperature re-equilibration because the base of the culture dish is in direct contact with a large mass of warm metal.
 - ❖ The actively-heated large thermal mass can transfer sufficient heat to re-equilibrate several dishes without falling below the target temperature (e.g. 37°C). Traditional “big-box” incubators rely primarily on transferring heat from the warm atmosphere inside the incubator since there is an insulating air gap between the dish base and the metal shelf – which is relatively thin with holes for air circulation.
 - ❖ Constant gas composition, since it is supplied from cylinders of pre-mixed gas of specified, and QC-assayed, composition.
 - ❖ The purge feature: gas equivalent to several incubation chambers “dead space” is flushed through the chambers after closing the lid. This replaces the air that filled the chamber after opening its lid and achieves the fastest possible recovery time of the intended culture atmosphere.
 - ❖ Because there are no gas controllers (e.g. for CO₂ or O₂) to worry about there is no need for regular independent measurements of the incubator’s internal atmosphere composition, or for QC checking of the incubator’s CO₂ and O₂ calibration.
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- The Planer BT37 (like the Cook MINC) uses a disposable humidification set (water bottle & tubing), including a 0.22 µm filter on the gas inlet, to reduce the risk of contamination (e.g. *Aspergillus*) inside the incubator.
 - A VOC filter can be placed in the pre-mixed gas supply line / manifold to prevent the accumulation of VOCs from the ambient room air inside the incubator.
 - Design features lead to there being a negligible effect of opening the incubation chamber upon the physico-chemical characteristics of the incubator’s internal environment, resulting in a remarkably more stable culture environment than can be achieved using “big-box” incubators.
 - Benchtop incubators are easier to clean / sanitize.
 - Benchtop incubators consume substantially less electrical power.
 - Benchtop incubators are cheaper to run than tri-gas big-box incubators.

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- The ease of achieving low pO₂ culture in benchtop incubators (*c.f.* tri-gas big-box incubators) leads to better quality embryos.
- Almost every IVF laboratory that has switched from big-box CO₂-in-air incubators to benchtops has seen significant increases in implantation rates, by up to a doubling, and hence in pregnancy rates.