

CASE STUDIES Fertility unit looks for highest incubator accuracy

A leading fertility centre, a centre of excellence in reproductive medicine with thousands of successful births to its name, was looking for the most accurate equipment available for its patients. The unit had always invested for the future, in personnel with leading doctors and laboratory directors and via the latest technologies. With success rates above the national averages for many years it realised the importance of control of all parameters when handling cells. Planer, established in 1973, also had a history of excellence in temperature control, so when it was looking for key customers for its new cell incubator it knew this particular one would give exacting feedback.

Many factors play a role in pregnancy rate among women who undergo ART cycles and the importance of controlling as many of the variables in cell handling, especially cells in ART, has been increasingly realised. Dr HL Higdon et al set the ball rolling in 2000 when they reported, in *Fertility and Sterility*, that **minute temperature differences** in identical incubators may have accounted for an almost 50% **difference in clinical pregnancy** rate. A key part in the 'production chain' of embryology is the incubation of cells as embryos mature. Traditionally gametes and embryos were kept in larger incubators with several shelves allowing a high number per machine. While excellent in many situations, these large incubators do not claim to offer the **precision that this new small volume chamber bench top incubator** does. The aim of Planer was to produce the most accurate incubator of its kind, ensuring that an embryo would suffer little or no exposure to variations from the desired set-points in humidity, temperature or pH – all now viewed as critical to development. These goals were of course complicated by the practical needs of opening the lids of the two patient specific compartments. A fast recovery of such parameters after lid opening was designed in, using independent Platinum Resistance Thermometers ported into lid and base unit. The converse – the removal of excess heat needed to keep to the steady set point - meant dual cooling fans were employed.

The ART facility itself had a track record of innovation - participating in clinical trials investigating the efficacy and safety of new medications, therapeutic devices, and treatment. This naturally involved issues such as optimizing embryo culture and embryo cryopreservation, embryo viability, assisted hatching, indications for and clinical value of pre implantation genetic diagnosis (PGD), endometrial receptivity, oxidative stress and infertility and elective single embryo transfer. Consequently precision in the key area of embryo handling was of prime concern.

The core of the incubator, now so well received, is a heated base and lid which provides the required stable environment. Using tightly packed, full-surface heating elements and dual cooling fans the unit is designed not only to hold a large range of differing culture dishes but to hold them in close thermal contact to the heating plates - giving exceptional heat distribution. A continuous pulse and bleed facility **optimises culture conditions** - and reduces gas usage. Other vital, for any lab user, but less technically exacting advantages, are the availability of built in "password protection" - so that no accidental changes can be made to the parameter settings and the built-in battery backup to keep the unit running for up to two hours in the event of power outs. The unit alarms in adverse instants – both audibly and through an Ethernet access port which allows remote monitoring and logging option.