

## **ABSTRACT OF DISSERTATION**

### **EVALUATION OF A PERSONAL HEAT STRESS MONITOR UNDER DYNAMIC CONDITIONS**

The Quest Electronics Questemp<sup>®</sup> II Personal Heat Stress Monitor was evaluated as to the ability of the adjusted-ear temperature measured and recorded by the instrument to equal a synchronous recording of the esophageal temperature and this equality would be maintained throughout all transient conditions.

Two female and eight male subjects each performed eighteen tests in a hot environmental chamber. Each test included an exercise and rest phase. The tests were differentiated by exercise and rest temperatures, presence or absence of air movement, metabolic exercise load and clothing. The internal heat load was generated by having each subject exercise on a stationary bicycle.

The instrument is intended to be used in conjunction with an effective heat stress management program as an alerting device when the wearer's core temperature has risen to unsafe levels. The study has shown that the monitor has deficiencies in accurately determining the body's core temperature. These deficiencies lie in the monitor's calibration method and the internal algorithm, which manipulates the actual ear canal temperature to an adjusted-ear temperature.

Taking into account these deficiencies, the instrument can serve as an adjunct tool in the overall management of employee exposure to heat stress, which includes environmental assessment, medical surveillance, worker education and self-determination.

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Summer 2000