



## Ergonomic Testing of the **zeroG<sup>TM</sup> Arm**

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## Executive Summary

The zeroG™ arm represents a new application of weight compensating technology that allows workers to manipulate and maneuver tools and parts as if weightless. A comparative study was conducted on the zeroG™ arm to test the perceived and actual physical exertion levels when using the device.

Testing was completed on subjects representing the 5<sup>th</sup> percentile female to 95<sup>th</sup> percentile male. Muscle efforts (EMG) of the upper extremities were measured during manipulation tasks involving a variety of load weights. Psychophysical workloads were measured as well as user perceptions of performance.

The test results indicated that overall the Equipois zeroG arm is an exceptional ergonomic device, providing low effort smooth operation throughout its full work volume with negligible inertial effects. A summary of the key findings are as follows:

- The perceived effort levels were rated well within recommended thresholds of performance, while identical manual manipulations exceeded recommended thresholds.
- Muscle effort levels were dramatically lower when using the zeroG arm. Total muscle work with manual manipulation was up to 305% of the effort used with the zeroG arm.
- Peak and mean muscle effort levels indicated a very low potential for fatigue with the zeroG arm.
- Peak and mean muscle effort levels indicated that manual manipulation of loads as light as 12 lbs were likely to produce fatigue.
- The test participants indicated that the zeroG was “extremely easy” to use and took less than a few minutes to learn.

Based on the positive test performance and measurable ergonomic advantages of the Equipois zeroG arm it has received the United States Ergonomics “Ergonomic Product Certification”.

