

HUMIDITY REDUCTION IN HELMER i.SERIES® AND HORIZON SERIES™ LABORATORY AND PHARMACY REFRIGERATORS: MEASUREMENT, COMPARISONS, AND OUTCOMES



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Introduction

Medical grade refrigerators typically offer a controlled temperature environment with superior temperature uniformity throughout the chamber. Unfortunately, refrigeration systems that achieve acceptable levels of uniformity also result in a humid storage environment. Typically scientific refrigerators run at humidity levels of 70% to 80%. For some stored products, such as blood bags, this is not a concern. However, for products stored in cardboard packaging, such as reagents, medications, and vaccines, the humid environment inside most medical grade refrigerators can create problems. High humidity levels lead to damp boxes that may become unreadable or fall apart.

Based on customer input regarding problems caused by high humidity in a refrigerated environment, Helmer decided to proactively address this issue by developing a proprietary approach to refrigeration for i.Series and Horizon Series Laboratory and Pharmacy refrigerators.

Testing Methodologies and Outcomes

Helmer humidity reduced refrigerators were tested in a variety of ways.

Method 1: A humidity data logger was placed in Helmer refrigerators with and without humidity reduction and a comparable unit from another leading scientific refrigerator manufacturer.

Result: Refrigerators without humidity reduction from both Helmer and a competitor each exhibited relative humidity of 70-80%, standard for scientific grade refrigerators. Helmer refrigerators with humidity reduction exhibited sustained relative humidity levels between 50% and 60% at a nominal temperature of 4°C. Beta sites reported reduced moisture condensation on stored product after humidity reduction was implemented. (See Exhibit A below).

Method 2: Helmer humidity-reduced refrigerators were loaded with water-saturated cardboard.

Result: In-house testing on humidity-reduced units loaded with water-saturated cardboard showed *significant* drying within a 1 week span. Non-humidity-reduced units loaded with water-saturated cardboard showed *limited* drying within a 1 week span.

Method 3: Helmer refrigerators were tested in-house with humidity reduction both enabled and disabled on the same unit to determine the effectiveness of humidity reduction.

Result: In all test cases, Helmer humidity reduction lowers average cabinet humidity levels from 70-80% to 50-60%.

Conclusion

Humidity reduction available on Helmer refrigerators results in relative humidity levels of 50% to 60%, with an average relative humidity of 55% at a nominal temperature of 4°C, while still maintaining optimal temperature uniformity. This represents a reduction in average relative humidity levels of 26.7% compared to standard scientific refrigerators.

The reduced humidity level inside Helmer Laboratory and Pharmacy refrigerators results in an environment that is well-suited for storage of water permeable materials such as cardboard packaging, making these models ideal for use by Clinical and Research Laboratories, Pharmacies, Health Departments, and for any application that requires a drier storage environment.

Exhibit A: A Comparison of Relative Humidity for Helmer Refrigerators versus Standard Scientific Refrigerators of a Competitive Brand at a Nominal Temperature of 4°C

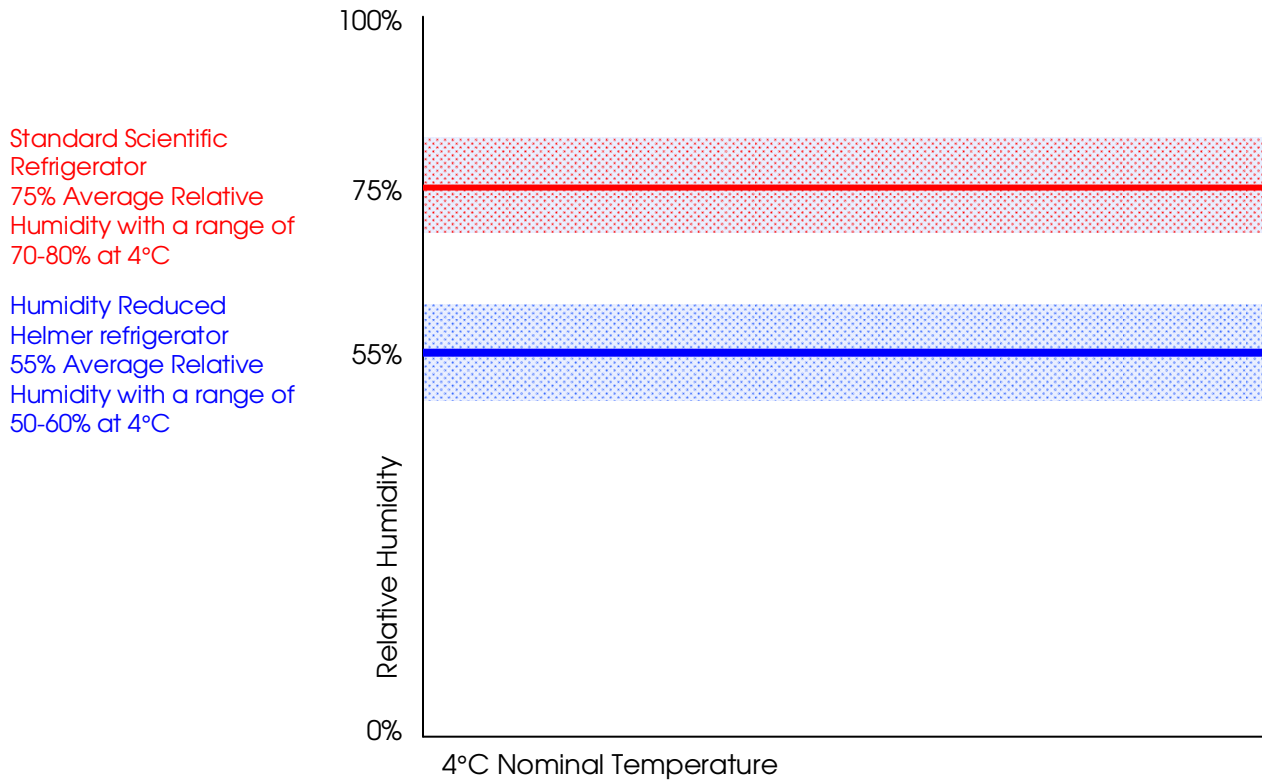
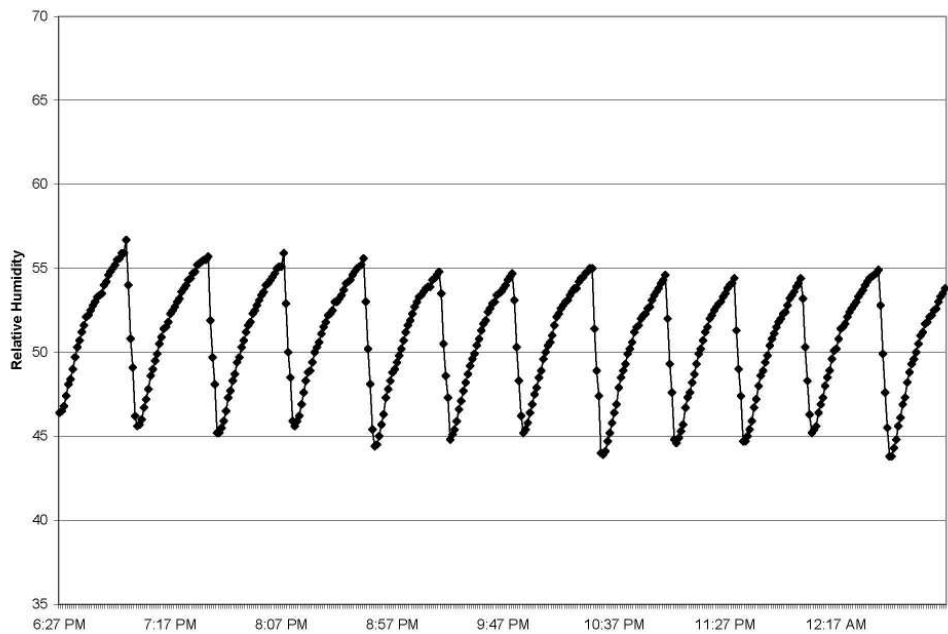


Exhibit B: Relative humidity levels in an iLR256 i.Series® Laboratory Refrigerator with drawers*



* Average relative humidity shows some variation with cabinet size and internal configuration. 55% average relative humidity reflects an upper limit. Some cabinets and configurations may achieve lower average relative humidity.