

**KILLION PATENT PENDING CONDENSATE REMOVAL SYSTEM MEETS GOVERNMENT MANDATED ENERGY EFFICIENCY REQUIREMENTS IN "SELF-CONTAINED REFRIGERATION"**



**WICKING SYSTEM**

Killion Industries has developed a patent-pending means that successfully addresses the elimination of ALL of the condensate produced from self-contained refrigerators while meeting government mandated energy efficiency requirements-- including DOE 2012 and soon to come 2017 regulations. (See more on back)



**EARLY LEAK DETECTION**

Killion Industries has also come up with a way to help minimize the potential for slip-and-fall injuries to the highest degree possible by utilizing an early leak detection system in conjunction with an auto system shut-down feature, should a potential leak condition be detected. (See more on back)



**Manufacturing Store Equipment for Top Retailers for Over 30 Years**

Killion has been manufacturing Checkout Stands, Refrigerated and Dry Displays, and Store Fixtures for over 30 years. Operating in 300,000 square feet of company owned facilities, Killion Industries is your store equipment solution for Sustainability, Energy Innovation, and Decor Environments. Browse our website and contact us to review your projects.





## **Wicking Condensate Removal System and How it Works-**

Killion refrigerators utilize a patent pending digitally controlled wicking condensate removal system that is specifically designed to help meet or exceed DOE energy consumption limits while maintaining the refrigerator's ability to remove all of the condensate that is generated under normal working conditions.

The condensate removal system utilizes a high efficiency wicking element that is located in a specially designed sump/ pan that allows the condensate to be drawn into it. The waste heat air that is coming off of the condenser is then ducted through the wicking element to help accelerate the evaporation process of the condensate. The ducting is designed to allow for the diversion of the condenser air-flow around the wicking element where too much back pressure would adversely affect the performance of the condensing unit.

Additionally, there is a heating element located in a sump area of the pan that is controlled by the refrigeration system's digital control unit. The digital control is programmed to force the heating element on every 12 hours in order to bring the condensate to a boil. This is to ensure that the microbes, bacteria, etc. that could lead to the development of mold, mildew, or other germs can be killed. This also assists in the acceleration of the evaporation of the condensate. The heating elements are forced off by the digital control unit if the actual energy consumption of the refrigerator could reach 95% of the maximum allowed by law.

A 6' PFW model series refrigerator has been tested in our ISO 17025 certified test lab and found to be able to remove all of the condensate that it generated during a 24 hour test period within a testing environment of 80° F and 85% RH. This is considerably higher than the refrigerator's normal design operating environment of 75° F and 55% RH maximum.



## **Early Leak Detection (ELD) Auto-Shutdown Feature and How it Works-**

Killion refrigerators may also utilize a unique ELD Auto shutdown feature that is integrated into the digitally controlled wicking condensate removal system. It works by utilizing a second sensor located under the condensate pan. This sensor is looking for a normal parameter exception, being in this case, the condensate getting too close to the point of over-flow in the pan.

Should a near condensate over-flow condition happen, a signal is sent to the digital control. The digital control then tells the compressor to shut down and turns the heating element to full on. During this condition, the digital control's display will show "ALR1" and there will be an audible alarm beeping.

The condensor fan will continue to operate in order to help accelerate the condensate evaporation process. Once the condensate removal system has brought the condensate back to within a normal operating level, then the refrigeration system will automatically reset itself.

The alarm condition will continue to display and the audible beep will continue to be heard until the refrigerator reaches normal operating temperature once again. At that point, the alarm display and audible beep will cease and normal operation will resume.

The digital control is manufactured to follow the RS-485 MODBUS ASCII protocol. It can currently be interfaced to store control systems by hardwiring. A Wi-Fi version will be available later in 2015. This version will be able to wirelessly talk to the store control system. We will be able to provide the interface including webserver versions as well.



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