Control and monitoring refrigeration systems to comply with HACCP

All across Europe, the importance and expectation consumers place on food quality is increasing. Retailers are required by law to demonstrate their ability to store and supply food produce according to predefined temperatures. Equally they must provide traceable evidence through the food chain for quality of the product supplied from the farm through to the final consumer.
EU Directive EN441 and subsequent extensions have established a clear legal requirement for a controlled process and procedure (HACCP) with constant monitoring and documentation of food through storage, distribution, and transport, and in the ultimate display case in the supermarket.

Danfoss, as a leading European manufacturer of refrigeration control systems throughout the food chain, utilises ADAP-KOOL® cutting-edge technology to support and enable these requirements with precise and accurate temperature control, while continuously monitoring and documenting them.

Display Cases and Cold Rooms

Through dedicated product designs, Danfoss specially designed EKC and/or AK-CC550 display case and cold room controllers to maintain precise temperatures and provide constant information on the cabinet performance.
Utilising sophisticated adaptive control routines within the cabinet, the controller measures the weighted value of the air-on/air-off across the evaporator and adapts the refrigerant injection to the evaporator to provide a “representative product temperature” within the case or cold room alike.

In addition, the provision of a separate, noncontrolling “product sensor” AK-HS1000 mounted in the most critical position within the cabinet, simulates the stored or displayed food product. This ensures tamperproof documentary evidence of cabinet performance and product temperature in compliance with HACCP legislation.

This can also be easily extended to merchandised displays and goods-intake with the AK-WS Wireless system, which establishes a clear and accurate record of events. This solution utilises the same independent HACCP product sensor (AK-HS1000) on the cabinets on cold rooms, combined with the manual handheld registration sensor (infrared or probe) for the goods-intake.

These special Danfoss product simulation sensors come from our production with a Certificate of Temperature Performance according to EN441-13. This innovative product responds directly to the needs of Store HACCP Management and supports their legal requirements, procedures, and documentation processes for the store.

Combined accuracy of Sensor and Controllers
It is not sufficient to have simple accuracy on just one part or another, but more so the combined accuracy of both sensor and controller to ensure an effective HACCP compliant solution can be achieved. As a consequence, the combination of the controllers EKC and/or AK-CC with AKS (Pt1000) temperature sensors, guarantees accuracy better than the stated conditions of +/-1°C across the full temperature range -30°C to +15°C.

This is a particularly important consideration when selecting automated equipment for control and monitoring the HACCP process and demonstrates a clear due diligence of the food supplier for the ultimate Consumer.

Pt1000 Sensor Accuracy
+/-0,3°C at 0°C +/-0,005°C x temp

Combined Controller and Sensor Accuracy
+/-0,975°C at -35°C

Accuracy Pt1000
+/-0,475 K +/-0,30 K +/-0,425 K

Accuracy system
+/-0,475 K +/-0,30 K +/-0,425 K
Constant Monitoring

The legislation, and indeed due diligence, requires constant and consistent monitoring of the CCP temperatures in a display case and/or cold room. Normally in small stores with limited or few display cabinets, this can be done manually. However with medium and larger sized stores, the constant check on cabinet temperatures can be time consuming and costly for the Retailer.

For any size of store, Danfoss can provide a local Systems Manager, AK-SC255, to illustrate and monitor the ADAP-KOOL® system and the various cabinet temperatures under control.

The temperature alarm functions taken through the system allow initial response to detected deviations. Communications from the Systems Manager to remote services monitoring, such as Retail Care™, ensure these incidences are registered and recorded without interference.

Thereafter, utilising the detail extracted from the ADAP-KOOL® control systems, Danfoss Retail Care™ remote supervisory monitoring system can automatically provide full and complete documentary evidence of the display and cold room temperatures throughout the store.

These are presented in daily temperature reports per cabinet/cold room, illustrating set temperatures, variants on these settings, and defrost occurrence.

Different levels of services and reports can be provided to suit the particular Store requirements and reflect the procedures employed.