

Testing a refrigerated display cabinet according to standards

Refrigeration experts at Smeva choose imc measurement solution



Figure 1: Smeva refrigeration unit containing simulated products for temperature testing.

Keeping things cool

Refrigerator units used in supermarkets, delis and shops are designed to keep perishable products at safe temperatures. To ensure that their refrigerators are performing within the scope of the ISO standards, the Dutch company Smeva enlisted the expertise from imc Benelux to come up with an optimal testing solution using imc products.

As a leading international company in the field of cooling technology, Smeva products are used all over the world. The R & D department was looking for a testing solution that could measure temperatures at several critical positions in the cooling units. The intention was not only to verify that the device is performing according to ISO standards, but also to be able to improve and optimize the design for efficiency.

An ideal solution using standard imc products

Smeva's test engineers needed a solution that would allow testing for several days on end and provide stability, reliability and PC independence. With imc test & measurement products, the solution proved to be straightforward and efficient: the integration of a single measurement device with easy to use software.

Hardware

imc SPARTAN

For the hardware, Smeva chose the imc SPARTAN measurement system. With its high-precision amplifiers, integrated signal conditioning, PC-independent data logging and internal backup power, the imc SPARTAN was ideal for reliable monitoring of temperatures, pressures and voltages within the refrigerator unit.



Figure 2: imc SPARTAN compact, high-precision measurement system

Providing synchronous sampling at up to 500 Samples per second per channel and capable of supporting up to 128 channels, the imc SPARTAN was perfect for this application.

Software

imc STUDIO

A key focus of the testing solution was to ensure ease of use for the customer and excellent graphical capabilities. This was accomplished with the modular software framework imc STUDIO.

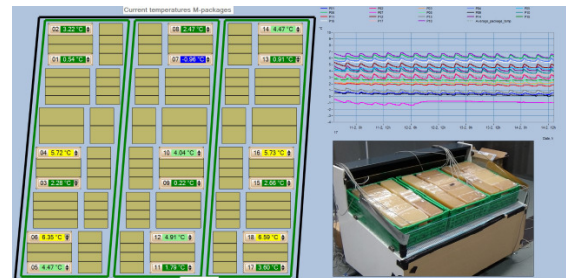


Figure 3: imc STUDIO GUI displaying current numerical and graphical temperature readings.

The data display options offered in the imc STUDIO Panel allowed the refrigeration testing to be viewed in a variety of customized, data-appropriate appearances. With over 100 predefined instrument templates and widgets available, it was simple to create specific and personalized testing interfaces using imc STUDIO.

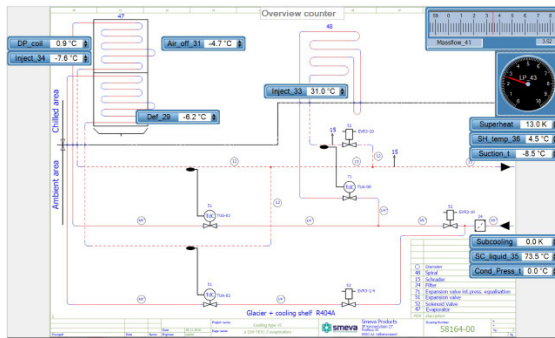


Figure 4: imc STUDIO Panel page with schematic, analog instrumentation and numerical displays.

The individual Panel pages can be navigated on command, either manually by means of tabs or by means of control widgets. Furthermore, the system can be programmed to automatically display particular pages, for example, when governed by a trigger, or in response to a certain system status, or through an automated sequence created with the imc STUDIO Sequencer.

imc Online FAMOS

imc Online FAMOS enables the transformation of raw measurement data into immediate result information within the measurement system itself, without involving an external PC. It can perform mathematical calculations on live data from multiple synchronized channels, calculate and record signal statistics and comparison operations, and is even capable of implementing advanced open-loop and closed-loop control and real-time test automation with deterministic response.

In this application, pressures in the cooling circuit of the refrigeration unit were translated directly to temperatures using the characteristic curve functionality in imc Online FAMOS.

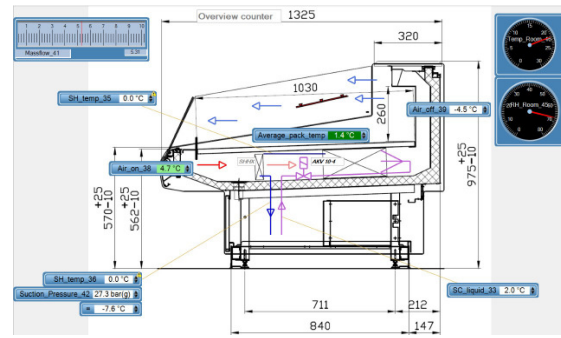


Figure 5: Screenshot showing cabinet temperatures and pressures.

In total, imc FAMOS offers over 150 functions and operations which may be combined to implement even the most sophisticated analysis algorithms. Such “virtual channels” of result values can be subjected to live monitoring and storage just like the real physical channels. And since the results are continuously calculated from streaming measured data, virtual channels can also be used as part of the control system or to define sophisticated triggering conditions for the measurement itself.

Conclusion

The test engineers at Smeva were dealing with a test and measurement problem that normally would have involved multiple pieces of instrumentation, interfacing difficulties and complicated software. However, thanks to the expertise from imc Benelux together with imc products, a stable, reliable and PC-independent testing solution was created.

The imc SPARTAN measurement device, with its ability to combine measurements of multiple physical quantities, combined with the ease of use and graphical capabilities of imc STUDIO, provided an ideal solution for measuring and analyzing the thermodynamic behavior of the refrigerator units.

At the end of the day, the test engineers at Smeva now had a test station that could thoroughly analyze the test data, generate test reports and was easy to control.

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imc Test & Measurement GmbH is a manufacturer and solution provider of productive test and measurement systems. imc implements metrological solutions for research, development, service and production. imc has particular expertise in the design and production of turnkey electric motor test benches. Precisely outfitted sensor and telemetry systems complement our customer applications.

Our customers from the fields of automotive engineering, mechanical engineering, railway, aerospace and energy use imc measurement devices, software solutions and test stands to validate prototypes, optimize products, monitor processes and gain insights from measurement data. As a solution

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