



FLIR Systems ThermaCAM™ P65 infrared camera inspects transformers before handover to customer

SMIT Transformatoren BV designs and produces large-scale power transformers, used among other purposes for transporting electrical current via high-tension cables. The company is based in the Dutch city of Nijmegen and has some 300 employees. With 90 years of experience, SMIT enjoys an outstanding reputation as a manufacturer for markets in Europe, the USA and Asia.

Transformers are used to transform the electrical energy generated at power stations to a high voltage which can then be transported via the mains network. At the points where the energy is taken from the mains network, a transformer is then used to reduce the voltage again.

SMIT Transformers: made to customer specifications

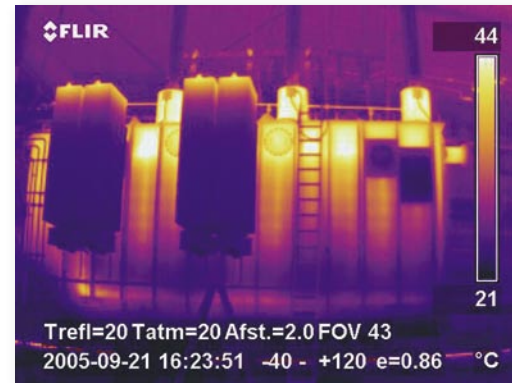
The construction of a transformer requires considerable know-how and skilled manual work: the great steel housing contains two or three reels carrying lengthy, fine copper cables, intricately welded to one another, which are wound onto the wooden reel with the utmost care in a set

pattern. These reels are set over a core of precisely sorted thin steel plates, and then inserted into the transformer housing. After the electrical connections have been laid, the housing is filled with oil. This serves as an insulating and cooling fluid for the transformer, which heats up significantly when in operation.



▲ Ernst Hanique, head of the High Voltage Lab and Steven Lauf, test technician and FLIR camera operator

▼ A transformer in infrared



▼ The interior of a 225 MVA transformer: reels and cables are covered with cardboard



▼ SMIT Transformatoren BV in Nijmegen



What is more, SMIT produces its transformers to customer specifications, meaning that there are no identical units rolling off the production line. Transformers have an average product life of forty years. With a price tag of around a million euros, they represent sizeable capital assets.

Customers request thermographic check

In the spacious hall of the High Voltage Lab at the Nijmegen site, brand-new transformers, many metres high, stand ready for their final inspection. This consists of a whole series of tension tests and investigations of noise generation, noise suppression and heat distribution.

"We don't mass-produce standard transformers," explains Ernst Hanique, High Voltage Lab Manager, who is in charge of the transformers' final check: "Our transformers are built to the customer's specifications, which is why measurements and tests before final handover are so important. These usually go off without a hitch, but the worst thing that can happen is that we have to open up one of the transformers."

To monitor the transformer's heating and cooling pattern, the Lab has purchased a FLIR Systems ThermoCAM P65 thermal imaging camera. The camera makes it possible to monitor the temperature distribution inside the transformer in minute detail, and to supply the customer with accurate images of it. These infrared measurements soon proved to represent added value for the customer.

"Some customers explicitly request a properly documented thermographic check for their new transformer," says Steven

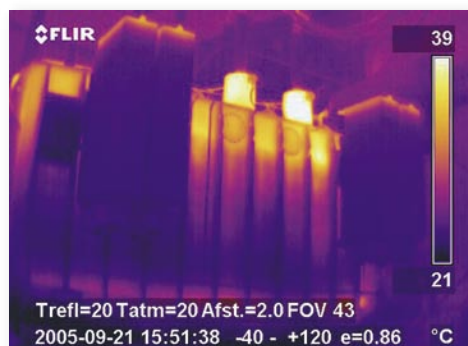
Lauf, test technician and calibrator, and operator of the infrared camera. "The clear image quality of the ThermoCAM P65 and the integrated visual camera provide a complete, coherent picture. And thanks to the accompanying Reporter Pro software, we are now also able to provide this information in a professional format."

The reports generated by the software are stored internally by the company: as virtually every transformer produced at SMIT is unique, all documents for each one, from construction drawings to acceptance records, are archived. The data is important for the service department, which needs to be able to reach and repair any SMIT transformer as soon as possible, anywhere in the world. "And we have 80 year-old transformers which are still doing excellently," adds Hanique significantly.

Interest in thermography is now being shown at other departments in the company. "The camera was an investment, and we took some convincing to order this versatile model," says Hanique, "but we now have a high-quality item which, as a fast, mobile, contact-free and visualising measuring and inspection tool, is sure to find many other applications in the company."

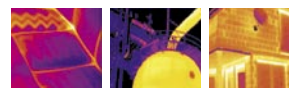
Thus, thermography is helping SMIT to supply perfect transformers while contributing to a further quality increase and cost reduction at the company.

▼ A 225 MVA transformer



▲ Heat generation in a 225 MVA transformer: the coolers are still shut

▼ View of a transformer from above



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