NEWS :

Dossier on electrical equipment services

ARE YOUR EMPLOYEES SAFE FROM OPTICAL RADIATION?

Laborelec tests legal compliance of lamps in the workplace

New EU legislation is forcing companies to assess optical radiation emissions in the workplace. As part of this legislation, companies must also ensure that all new lamps comply with regulations relating to their energy efficiency and UV emission. To assist companies in this process, Laborelec is conducting both on- and off-site compliance tests using spectroradiometer equipment.

Checking optical radiation compliance at work

By 27 April 2010, all EU Member States must have implemented the 2006/25/EC directive. This directive lays down the minimum health and safety requirements for the protection of workers from risks arising from exposure to artificial optical radiation. It primarily relates to ultraviolet (UV), blue light, and infrared radiation, and applies to a wide variety of workplace activities. These include, for example, welding in metal work industries, UV sterilization in the pharmaceutical sector, and the various types of lighting in industrial and office spaces. If levels exceed the maximum exposure limits, workers are obliged to wear protective equipment like gloves or sunglasses.

'A number of companies have already asked us to carry out measurements on their site,' says Jean-Michel Deswert. 'These tests are performed using a specialized mobile spectroradiometer, which is placed in areas where workers are at most risk of exposure. The measurements determine whether or not specific protection is required.'

Testing lamp ecodesign requirements

Another EU regulation that was introduced recently is the 2005/32/EC directive regarding ecodesign requirements for non-directional lamps. Since 18 March 2009, all new lamps must meet specific energy efficiency and UV emission criteria.

'In order to provide quick answers to a customer's enquiries regarding lamp tests, we purchased a new spectroradiometer for our laboratory,' notes Deswert. 'The Belgian Ministry of Health also requested us to test 75 common low-energy lamps currently available on the Belgian market and to measure their UV emission. These tests are still under way.'

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OPTIMIZING CONDITION ASSESSMENT OF ELECTRICAL EQUIPMENT

Laborelec is continuously looking for better ways to trace degradation of electrical equipment such as transformers, alternators, electrical motors, cables, switchgear, and lighting devices. Based on electrical, mechanical, and chemical assessments, our experts can assist customers in preventing unforeseen outages and optimizing their maintenance plans. In this edition we give a few examples of how our expertise has recently helped prevent major damage. We also illustrate how our customers have already benefited from some of our most recent R&D programmes.

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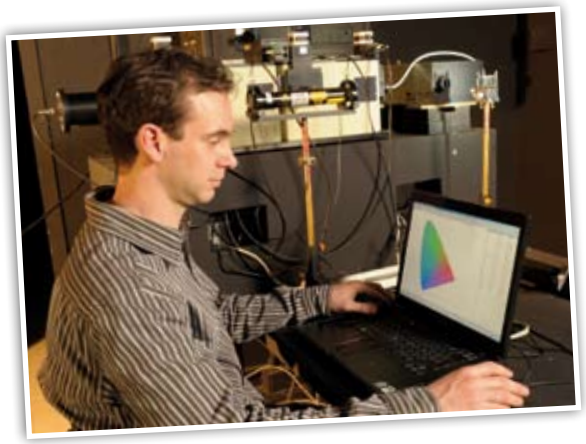

Using a newly acquired spectroradiometer, Laborelec tests whether lamps comply with the latest ecodesign requirements.

In short

- Companies must comply with a new EU directive regarding exposure of workers to artificial optical radiation
- Another EU directive introduced recently prescribes specific ecodesign requirements for lamps
- Laborelec carries out on-site and laboratory tests to assess compliance with both these regulations

CAUSE OF CABLE BREAKDOWN IDENTIFIED ON SITE

An important industrial manufacturer in Belgium experienced a breakdown of a major medium voltage (MV) cable. The company contacted Laborelec to carry out a cable assessment and identify the cause of the breakdown.

The MV cable feeds a number of critical equipments at the plant. Its breakage resulted in an unplanned shutdown of part of the plant. 'We first carried out a condition test on the cable,' says Bruno Starren. 'The test revealed high delta tangent values between the conductor and the outer side of the installation, which meant the quality of the insulation was not as it should be. Further insulation resistance tests using a Megger tool confirmed the problem and indicated that the cable was damaged somewhere.'

Water inside the cable

'Working closely with the customer, we tracked down the damaged section of the cable to a specific point on the roof of the building. The outer cable sheath was damaged and water had penetrated the cable,' adds Starren. 'We removed the damaged section of the cable and carried out new measurements to determine if there were any other problems. These tests indicated that the remainder of the cable was intact. We also provided advice on possible options to restore the quality of this MV line.'

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MONITORING TRANSFORMER AND LUBRICANT OIL CONDITION AROUND THE WORLD

Approximately 30% of all oil analyses performed at Laborelec are for customers outside of Belgium. Among them power plants as well as industrial customers from more than 25 countries. Laborelec owes this to its vast array of oil analysis related services.

Laborelec offers customers oil acceptance tests. Our experts assist customers in selecting the right oil for specific applications. 'We also verify whether the oil delivered by the supplier meets the specifications ordered,' explains Julie Van Peteghem.

Laborelec can also verify whether the transformer is ready for start-up after the oil is approved. Steve Eeckhoudt: 'We check all oil parameters and make sure everything is in place for a safe and efficient start-up.'

Once the transformer is up and running, it is vital to analyze the oil's condition on a regular basis. 'The state of the oil is an excellent indicator of the transformer's overall condition. We can identify potential problems at an early stage through routine tests and on-line monitoring,' says Eeckhoudt. 'This enables us to help our customers maximize the availability and reliability of their equipment.'

Not only our transformer oil analyses enjoy worldwide recognition, our lubricant oil activities are also rapidly gaining international demand.

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The Laborelec Oil Laboratory receives service requests from all over the world. Distance is no longer a consideration. Oil samples can be sent easily and rapidly via international couriers.

In short

- Laborelec analyzes oil samples from all over the world
- Experience with oil acceptance tests, transformer start-ups, routine tests, and on-line monitoring
- Activities cover transformer as well as lubricant oils

TRANSFORMER CONDITION ASSESSMENT IN THE NETHERLANDS

R&D on oil analysis bears fruit in the field

Laborelec conducted a second opinion oil analysis on three transformers for Liandon, the centre of expertise for Dutch network operator Alliander. Our experts used their fine-tuned interpretation scheme to pinpoint an internal problem. The results confirmed the customer's suspicions and convinced asset management to take action.

Based on earlier tests and oil analyses, Liandon suspected serious internal contact degradation in the on-load tap changer in three Alliander transformers. However, before conducting a complete internal inspection and repair they requested a second opinion analysis by Laborelec.

Quick and accurate interpretation of dissolved gas analysis

'Our analyses of the oil's furan and methanol content revealed that the insulation paper was still in good condition. The dissolved gas analyses, on the other hand, indicated two internal defects that could lead to problems in the short run,' explains Steve Eeckhoudt. 'Our recently updated in-house interpretation scheme enabled us to link the gas patterns to a melted contact in the transformer's on-load tap changer.'

Second opinion convinces asset management

The Laborelec test results confirmed the suspicions of Liandon. This confirmation convinced asset management to transport the most severely damaged transformer to a repair shop. 'The internal inspections revealed that the contacts of the tap changer had indeed melted,' states Eeckhoudt. 'The other suspect transformer will be taken out of service for internal repair as soon as possible.'

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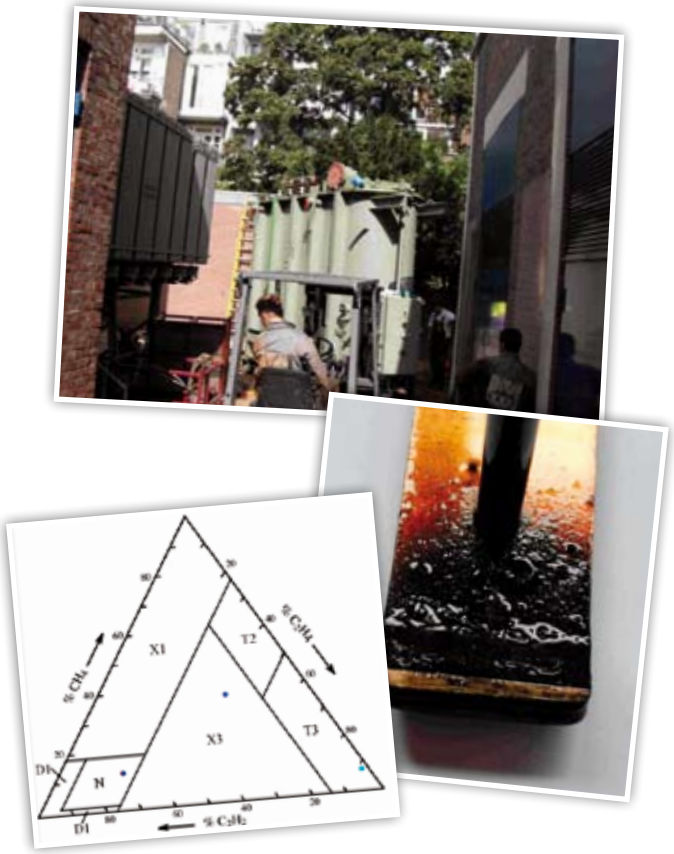
R&D enhances transformer condition assessment

Laborelec, in collaboration with consultant Michel Duval, has fine-tuned its dissolved gas analysis interpretation methodology. The project was conducted within the framework of the International Council on Large Electric Systems (CIGRE). 'The improved interpretation schemes enhance the precision of our advice even further. For instance, our experts are better able to trace degradation of tap changers. The Alliander case provided clear proof of this,' explains Eeckhoudt.



The fine-tuned interpretation schemes enable Laborelec to quickly and accurately link the results of dissolved gas analyses to a specific failure.

"FINE-TUNING THE INTERPRETATION SCHEME HAS ENHANCED THE PRECISION OF DISSOLVED GAS ANALYSES"

In short

- Laborelec performed a second opinion oil analysis on three Dutch transformers for Liandon, the expertise centre of Dutch network operator Alliander
- The in-house developed interpretation schemes enabled our experts to identify a problem with the tap changers based on a dissolved gas analysis
- Our advice confirmed the Liandon tests and convinced the asset manager to transport the most severely damaged transformer to a repair shop

IDENTIFYING AGEING MECHANISMS IN TURBO-GENERATOR WINDINGS

Powerful diagnostics tools for every situation

Laborelec has all of the tools necessary to execute off-line electrical measurements on small, medium, and large turbo-generators. This creates valuable insight into the condition and remaining lifetime of the equipment's insulation.

Most of the turbo-generators in the GDF SUEZ power generation fleet have been in service for 30 to 40 years. This raises questions regarding the state of the various insulation layers. Do they require re-winding and, if so, how urgent is this work? Laborelec has the tools and expertise to help answer these questions.

Powerful and usable power sources

Laborelec has acquired three power sources. These enable our experts to measure partial discharges on small, medium, and large generators under the best possible circumstances. Selection of these tools relied on three main criteria. Jeroen Van Cotthem explains: 'First of all, for practical reasons they must operate on net current. For large generators, we opted for a power source that can boost the current by use of a resonance coil. Secondly, the tools must enable measurements on all three phases simultaneously so that we can identify partial discharges between phases. Last, but not least, we needed a tool that allows us to perform measurements in cramped locations such as in a bulb-type underwater generator of a hydroelectric plant. Our compact power source allows us to do just that.'

Worldwide electrical diagnostics measurements

Laborelec has already put its power sources to good use. 'We recently conducted a measurement campaign using our large power source on a conventional power plant alternator in Belgium,' illustrates Van Cotthem. 'We are also using our compact source to regularly measure partial discharges at the French hydroelectric plants of the Compagnie Nationale du Rhône and SHEM. This will continue in 2010 along with five other projects that have already been scheduled.'

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The Laborelec power sources not only identify ageing mechanisms, they also allow for trending and comparison with other generators.

"THREE SEPARATE TEST SETS DIAGNOSE THE CONDITION OF SMALL, MEDIUM, AND LARGE ALTERNATORS"

In short

- Laborelec is able to diagnose the condition of the winding insulation of small, medium, and large generators
- It deals with powerful voltage sources to measure partial discharges off-line
- The tools have already proven their value in the field

Information days for Fabricom staff

Laborelec recently organized the first of two information days in Linkebeek dedicated to Fabricom Industrie Sud experts. While both companies are part of the GDF SUEZ Group, they still have things to learn about each other. 'We wanted to inform Fabricom of what we do, particularly in the area of electricity related services,' explains Georges Meyers. 'It was also an opportunity for us to hear about Fabricom's approach. By better understanding the scope of each company's activities, we can identify and focus on how we complement each other. This leads to new ways of collaborating and to improved customer service.'

A first session was organized in French in October. This event was attended by 30 Fabricom Industrie Sud experts – primarily senior project managers covering the industrial sector. A second session will be organized in Dutch in the coming months.

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