



Fiber Optic Temperature Monitoring

Best-in-Class Fluoroptic- and GaAs-Based Solutions for Winding Hot Spots

- Maximize transformer performance with accurate, direct, real-time hot spot measurement
- Extend transformer life
- Improve asset management strategies, such as dynamic loading
- Prevent problems and optimize maintenance

A Global Leader in Fiber Optic Temperature Sensors for Transformers

The unprecedented growth in electric power consumption has created increasing demand for effective management and monitoring of utility companies' most valuable assets – power transformers. Utility companies face many challenges when it comes to protecting and preserving the life of their transformers. Complex temperatures and harsh environments, such as high voltage and RFI and EMI emissions make accurately measuring hot spot winding temperature in transformers difficult.

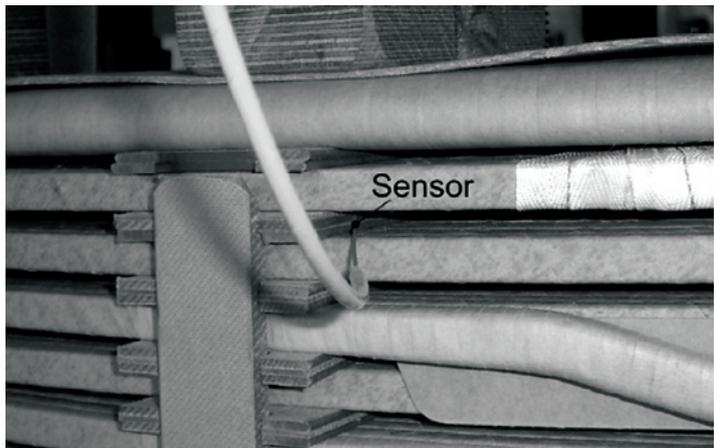
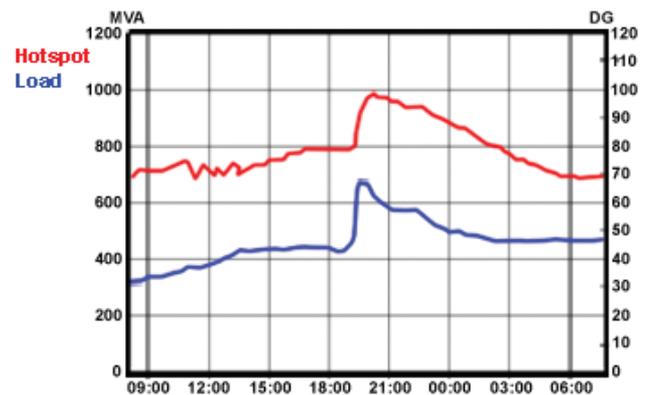
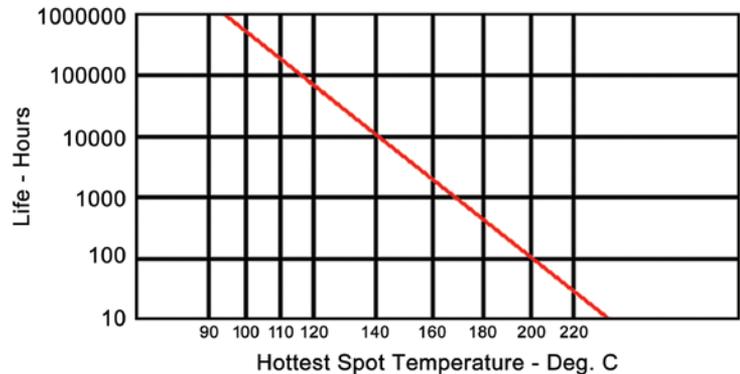
Winding hot spot temperatures are one of the most critical transformer measurements. Hot spots are the highest temperature area in the transformer based on flux leakage from the windings and can degrade the insulating paper making the transformer susceptible to failure. Since transformer life is dependent on the insulating paper, accurately monitoring over temperature conditions is critical.

It has been shown that top oil has significant time lag related to winding real temperatures. Conventional methods that use top oil temperatures to either simulate or calculate the winding hot spot, can show up to 20°C difference from the actual hot spot temperature.

Because transformer aging rate doubles for every 6°C over temperature set point, inaccurate temperature measurements can lead to transformer damage and transformer loss of life.

Fiber optic monitoring enables true “hot spot” measurement by sensing temperature directly in the windings. In addition to being immune to High Voltage, RFI, EMI and transformer oil or SF6 gas, this direct, dynamic measurement system allows utilities to:

- Verify transformer design integrity and manufacturing quality
- Safely maximize normal loading without damaging insulation or reducing transformer life
- Achieve true dynamic loading capability
- Accurately establish a “temperature baseline” during manufacturing that can be referenced in the future
- Detect cooling system malfunctions that would not be detected by conventional methods
- Easily facilitate condition-based maintenance and inspection activities
- Allow for cooling system control directly from the Winding Hot Spot, therefore extending transformer life and controlling the hot spot temperature
- Enable Smart Grid programs by providing critical temperature data to support asset management
- Eliminate calibration and maintenance on temperature monitoring equipment



LumaSense's LUXTRON brand offers energy and utility companies two solutions:

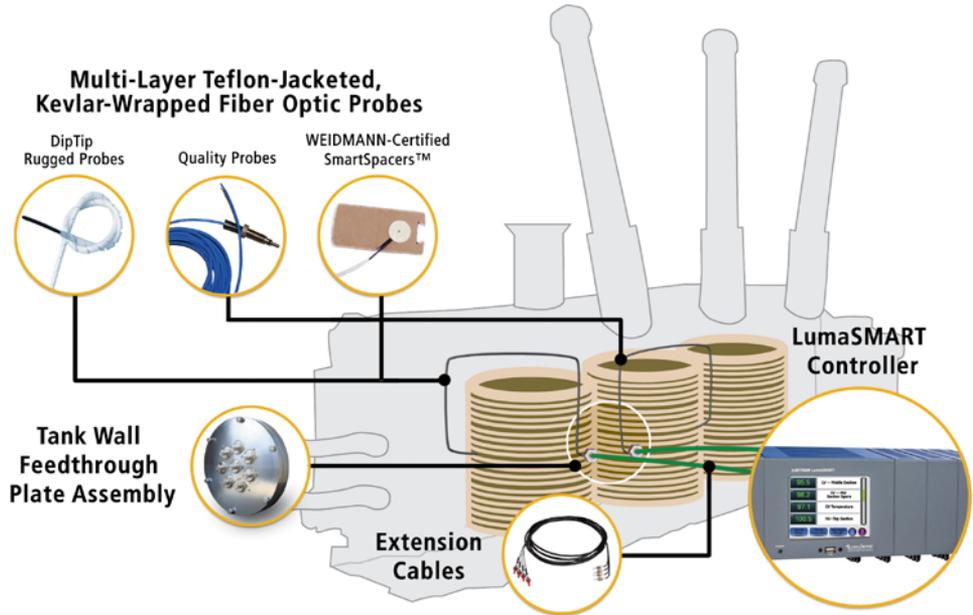
- LumaSMART a fluoroptic-based temperature solution for EHV/UHV/HVDC transformers, large power transformers and reactors; and
- LumaSHIELD a GaAs-based temperature solution for transmission and distribution transformers.

LumaSMART Fluoroptic Thermometry Fiber Optic Temperature Sensing System

Our latest innovation, the LumaSMART, is a monitor and probe system that provides accurate, real-time temperature readings for winding hot spots in EHV/UHV/HVDC transformers, large power transformers and reactors.

Key Features

- Multi-layered PFA Teflon-jacketed rugged probes are considered the highest quality probes in the industry
- Fiber optic probe tip encapsulation ensures greater than 99% installation success
- DipTip Rugged Probes™ are available with SmartSpacers™ certified by WEIDMANN
- State-of-the-art instrumentation with a touch screen interface, all protocols, full control relay modules and memory storage for the life of the transformer
- Welded tank wall plate feedthroughs to prevent oil leakage



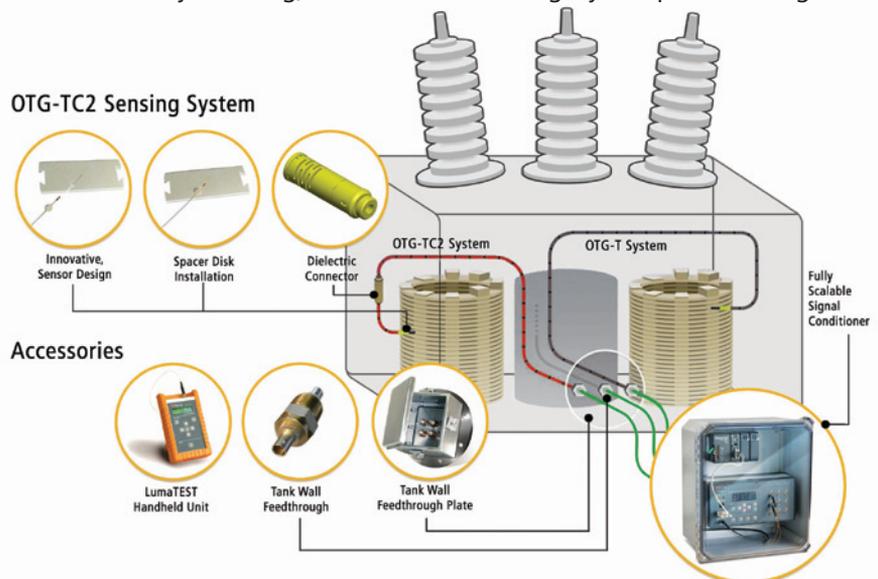
LumaSHIELD GaAs-Based Fiber Optic Temperature Sensing System

The LumaSHIELD is a product in the LUXTRON fiber optic family of temperature monitoring solutions. The LumaSHIELD monitor is a GaAs-based temperature monitor ideal for measuring winding hot spots in transmission and distribution transformers with limited asset management budgets.

LumaSense's GaAs-based probes include perforated PTFE tubing, spiral wrap protective sheathing and a protective probe tip encapsulation. These features ensure easy handling, sensor and cable integrity and protection against mechanical stresses.

Key Features

- Instrumentation with innovative internal reference calibration for 0.8 °C accuracy with no calibration required
- Under-Oil Dielectric Connector for easy probe installation by transformer manufacturer
- Probes include Spacer Disks for flawless installation
- Software allows instrument setup and analysis of temperature data from your laptop or PC



Experts in Fiber Optic Temperature Sensing Measurement

LumaSense Technologies pioneered fiber optic temperature measurement and has been serving the energy, utility, industrial, medical and semiconductor industries for over 30 years. LumaSense is the world leader in fiber optic measurement in transformers. Our instruments have been installed in over 5,000 transformers worldwide, and we continue to be the innovator of sensing technologies. As the only manufacturer of both Phosphor- and GaAs-based fiber optic temperature sensors, LumaSense provides the most accurate, rugged, superior temperature measurement solutions available on the market today.

LumaSense's LUXTRON brand of innovative temperature measurement solutions uniquely address the critical issues encountered by transformer and electric utility managers—accuracy, long-term reliability, ease of installation and seamless integration into existing infrastructures.

Trusted by Partners

Our proven quality has earned the trust of transformer manufacturers, transformer monitoring companies and utility companies around the globe. We are official partners to Weidmann, Messko Reinhausen and Dynamic Ratings. References for our portfolio of services and products are always available.

Superior Manufacturing

- ISO certified (9001:2008)
- Complete manufacturing records available on each product
- We perform extensive testing on our products during the manufacturing process
- Dedicated quality department

Service Excellence and Global Reach

Providing world-class customer support is an integral part of LumaSense sensing solutions. Our dedicated application engineer department provides superior technical support at every phase of implementation—evaluation, design, deployment, testing and training.



LumaSense Technologies

Awakening Your 6th Sense

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Fiber Optic Temperature Measurement Brochure Rev. 06/26/14