



PROXISENSE
Sensing in Extreme Environments

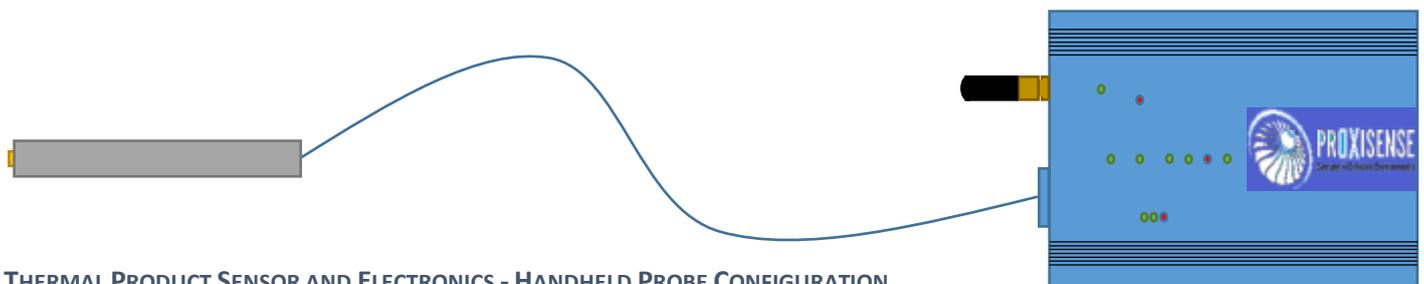
Thermal Product
Sensor
Overview - Oil

Introduction

A new and novel measurement technology based on techniques developed during heat transfer assessment has been developed by ProXisense. Called Thermal Product, the technology allows for a non-intrusive and non-invasive measurement process which enables a host of new and easy opportunities for measuring composition and condition monitoring, on a continuous and real time basis, of numerous solids, liquids and gases. The technology has numerous potential applications across many markets. To date interest has been seen across the Aerospace, Chemical, Mining, Energy and Medical industries. ProXisense is working with a small cluster of Blue chip clients deploying this technology in a number of applications including in-service Jet engine lubrication oil condition and contamination assessment, monitoring and assessment of an ongoing chemical reaction process, water contamination and accumulation in Aviation fuel storage, transportation and delivery systems and the assessment of rocks for suitability as raw stock for industrial process.

The technique uses a very flexible system approach that can be streamlined to particular assessment environments. The sensor is very compact and robust and consists of a platinum thin film or pulse gauge that can be coated to allow for operation in harsh environments. Sensors are coupled to signal processing electronics which record measured data and can indicate condition directly or via a computer either hard wirelessly connect. A variety of system configurations are available these include a standard handheld device fitted with a wand, a desktop devices for sample measurement through to bespoke engineered in-line and in process system.

The Thermal Product System operates in real-time and as such the composition, any contamination and degradation of a substance can be continuously displayed. Also the system will store the full data set into an Excel compatible file format with measured temperature for further data analysis. The live data can be viewed locally or via an interfaced ProXisense Digital Signal Processor for actionable indicator reporting remotely via the World Wide Web.



THERMAL PRODUCT SENSOR AND ELECTRONICS - HANDHELD PROBE CONFIGURATION



PORTABLE LIQUID CONTAMINATION AND CONDITION SENSOR (POT)



HANDHELD SENSOR (WAND)

Example Application : Condition Based Lubrication Oil Monitoring

The Thermal Product Sensor can accurately measure the condition of oil and detect minute levels of contamination and debris such as water, metallic particulates (both ferrous and non-ferrous) and non-metallic particulates (such as ceramics). In addition, the thermal product sensor is an excellent measure of change in oil condition and can detect the level to which oil within a system has been thermally stressed and therefore the rate at which lubrication properties are deteriorating. This measurement can be used to determine and alert when oil needs to be changed and it can also be used to measure the rate of degradation and therefore help to predict when lubricating properties are going to be potentially compromised. Quite often this is of concern in aero and maritime lubrication systems where the oil can lose additives resulting in reduced lubrication and cooling properties.

The Thermal Product Sensor System can be deployed inline in a moving fluid or as a sump plug in a static sump system. Particles as small as 5 Microns are readily detectable using the Thermal Product Technology. In addition, the sensor has been demonstrated to detect silicon nitride ceramic particles of 10 μm .

Predictive Maintenance

As trends shift toward condition based maintenance, the Thermal Product Sensor System is equipped with a software suite that can analyse and predict when systems or equipment are reaching critical levels. The data can be trended to predict in advance system issues or oil change intervals.

One instance of this is intelligent Mag Plugs. Eliminates the need to remove mag plugs from engines for manual inspection to check for debris. The rate of change of debris can be measured, reported and recorded for further analysis. The Thermal Product Sensor allows the identification of specific materials and hence can help to identify which components are wearing and how long it might take to fail.



TYPICAL ENGINE SUMP SENSOR

Analysis of Data

The electronics box has several indicators which can be user programmed for thresholds to provide trigger points which can include a Red/Amber/Green traffic light system. The system could be deployed for visual monitoring of the condition of Oil within any lubrication system.



WIRED IN-LINE SENSOR