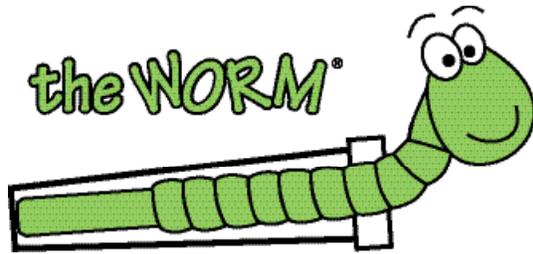


September 2010



The WORM® from Moore Industries boldly goes where no rigid sensor has gone before.

Flexible temperature sensors are the new frontier in accurate temperature measurements and easy maintenance. The WORM's mission: to fit nearly everywhere, to be quickly cut to the correct length, and to reduce the number of spare parts a plant has to keep on hand.

The WORM is a flexible sensor for thermowell temperature assemblies. It was designed to replace restrictive, rigid, straight sensor probes with a universal strategy that saves time and money.

When it comes to flexible and rigid temperature sensors, both can be inserted into thermowells or protection tubes, welded into place on boiler tubes or other objects, or clamped down for surface measurements. Both types of sensors are rugged, durable, and can measure a wide range of temperatures in industrial applications. So, why replace rigid, straight sensors?

Why Replace Rigid Sensors?

Rigid sensors have always posed installation and maintenance problems. It is difficult to work with rigid sensors—keeping the correct spares and replacing the sensors in “sagging” or dirty thermowells are some of the problems. When used with thermowells, a rigid sensor has to be the correct length to fit. That means a plant must keep several different lengths of spares in stock to fit every thermowell. If a thermowell sags from extreme heat or fills with debris, a replacement sensor often will not fit, and the thermowell needs to be replaced.

Replacing a rigid sensor can be difficult. Typically, a maintenance technician has to remove the enclosure

“The WORM’s mission: To fit nearly everywhere, to be quickly cut to the correct length, and to reduce the number of spare parts a plant has to keep on hand.”



Figure 1. A flexible temperature sensor, such as the WORM, has many advantages including easy replacement during maintenance and minimal need for spares, because “one size fits all.”

cap, disconnect the wires from the transmitter or terminal block, disassemble the union, conduit and fittings attached to the transmitter and thermowell, and then move them out of the way before he or she can pull the rigid sensor out of the thermowell.

The flexible sensor was developed to ease these problems. The flexible sensor typically consists of a one inch, stainless steel sheath with an element and lead wires that are protected either with Teflon or fiberglass insulation. A flexible temperature sensor, such as the WORM, slides into a thermowell or protection tube and is held in place with a spring (Figure 1). Advantages include easy replacement during maintenance and minimal need for spares—flexible sensor wires can be trimmed to the correct length, simplifying the need for spare parts because “one sensor size fits all.”

Learn More About The WORM

<http://www.miinet.com/theworm>

Application Video • Data Sheet
• Ready-to-Install Options

Get Rid of Rigid: Get **The WORM** Flexible Temperature Sensor

Advantages of Flexible Sensors

In which applications do flexible sensors, such as the WORM from Moore Industries, excel due to their inherent design?

The original design goal of flexible sensors, such as the WORM, was to provide a sensor that could be cut in the field to accommodate various size wells and assemblies. Field experience has proven this design helps end users with other obstacles:

- 1. Flexible sensors help eliminate the debris problem.** Over time, wells accumulate dirt, mineral deposits, corrosion scaling and the like on the inside of the wells. Starting with a 0.25 inch O.D. sensor and a 0.26 inch I.D. well, and adding debris in over time makes it very difficult to get the sensors in and out of the wells. Conversely, the WORM has flexibility plus a 0.237 inch O.D., which gives it an advantage to get past the debris.
- 2. Wells installed horizontally have a tendency to sag with time and temperature.** Removing and reinserting a rigid sensor can present challenges, whereas flexible sensors can literally overcome these challenges by sliding through a sagging well.
- 3. The “solid sheath” portion of flexible sensors is minimized.** This gives the flexible sensors advantages in applications where measurement speed is critical. The long solid sheath in rigid sensors serves as a heat sink sucking heat away from the hot tip of the sensor. The thermodynamics have to stabilize before the tip of the long solid sheath can achieve a process temperature. That same effect is radically reduced in the WORM since the sheath is short, only 1.5 inches long (Figure 2).



Figure 3. The WORM is available in Ready-to-install Assemblies for surface measurements.

- 4. Flexible sensors gain durability in higher vibration applications.** With a straight sensor, vibration inherent in industrial applications accelerates the rate of wear and can cause damage to the equipment. The WORM assembly options offer a 10G High, or 30G Extreme Vibration Sensor.
- 5. Replacing an old, straight sensor with a flexible sensor is easy and fast.** In the WORM design, the user can install and replace an old sensor by going through the enclosure. In this installation, the flexible sensor bends around and through the top or face of the enclosure. It slides through the enclosure’s entry port, and snaps into place without removal of the enclosure, rigid conduit, connection head or any assembly components.

The WORM also boasts faster response times delivering **step response times 13 percent faster** than standard sensors. That is because of the smaller 1.5 inch sheath that has less mass than long sheaths found in rigid, straight sensors.

Flexible Sensor with Short Solid Sheath



Rigid Straight Sensor with Long Solid Sheath



Figure 2. Flexible temperature sensors, like the WORM have a minimized solid sheath. (In the case of the WORM, only 1.5 inches.) This shorter solid sheath leads to step response times 13 percent faster than standard straight sensors.

The versatile WORM is available in popular RTD and thermocouple types including 100 and 1000 ohm platinum RTDs; plus J- and K-type thermocouples (others available upon request).

Moore Industries WORM is also available in Ready-to-Install Temperature Assemblies for Surface Measurements. They clamp, bolt or weld directly to tanks, pipes, motors, compressors, reactors or anywhere else a skin (surface) temperature sensor measurement is needed (Figure 3).

Get rid of the rigid sensors in your process. Save time and money. Get the WORM flexible temperature sensor.



WORLDWIDE • www.miinet.com

United States • info@miinet.com
Tel: (818) 894-7111 • FAX: (818) 891-2816

Australia • sales@mooreind.com.au
Tel: (02) 8536-7200 • FAX: (02) 9525-7296

Belgium • info@mooreind.be
Tel: 03/448.10.18 • FAX: 03/440.17.97

The Netherlands • sales@mooreind.nl
Tel: (0)344-617971 • FAX: (0)344-615920

China • sales@mooreind.sh.cn
Tel: 86-21-62491499 • FAX: 86-21-62490635

United Kingdom • sales@mooreind.com
Tel: 01293 514488 • FAX: 01293 536852