

Application News

High Accuracy Turbine Meters for Racing Engines

Industry: Automotive

Service: Flow Rate Measurement

Fluid: Engine Oil

Overview

Today's high-performance racing engines operate under extreme stress. The job of oil in these engines involves more than merely providing lubrication for rotating and sliding surfaces; it also acts as a coolant. Engine coolant and water play another important part in maintaining proper engine temperature. Heat from combustion and friction is conducted into the block and heads. It then goes into the engine coolant and is rejected by the radiator.

Situation

A manufacturer of high performance engines for race boats conducted tests to determine the performance of their engines under extreme conditions. In this case, the engine builder needed to monitor and record various data points related to oil flow—a critical factor in engine performance and reliability. However, changes in fluid temperature can cause oil viscosity to shift. These changes must be accounted for in order to ensure precise flow rate data.

The engine manufacturer previously used a Flow Technology turbine flowmeter with a single oil blend calibration for the test procedure. This meter was unable to account for viscosity changes due to temperature, limiting the accuracy of its flow measurement readings.

Solution

After consulting with the engine manufacturer, Flow Technology recommended a re-calibration of the existing turbine flowmeter to improve its overall accuracy and performance. Flow Technology first replaced the meter's existing pick-off sensor with one able to sense fluid temperature using a build-in RTD. It subsequently re-calibrated the meter at two different viscosities covering the temperature range of the engine oil. The calibration data was programmed into Flow Technology's LinearLink® TCI temperature-compensating flowmeter interface. The LinearLink TCI sends a temperature-compensated signal to the customer's data acquisition computer for accurate recording of engine oil flow rate.

System Description

The Flow Technology turbine flowmeter (Part Number FT-10NENB-LEA-2) was calibrated at viscosities of 25 and 250 cSt. A "U2" Universal Viscosity curve was chosen so the meter would be calibrated at the two viscosity extremes. The "T5" sensor with built-in RTD senses oil temperature. Calibration data from the new meter was programmed into the LinearLink® TCI (Part Number LNT-3-C0-F1B6), which was installed in a NEMA 4 weatherproof housing. The LNT reads the flow and temperature inputs and compensates for shifts in viscosity due to changes in oil temperature.

Technical Information

Flow Meter: FT-10NEU2-LEAT5
Electronics: LNT-3-C0-F1B6
Flow Rate: 0.15 - 14.81 GPM
Fluid: Engine Oil



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