MARINE INDUSTRY

OPTIMIZE ENGINE FUEL BURNING WITH MORE RELIABLE VISCOSITY CONTROL WITH THE MICRO MOTION VISCOMASTER

Micro Motion Heavy Fuel Viscosity Meter

RESULTS

Reduced maintenance costs and spare parts inventory

Reduced installation costs with the availability of a viscosity meter replacement kit

Optimized the fuel combustion and reduced engine wear

Application

The largest lifetime operating cost of a ship is the fuel that it uses to power its engines. If the fuel is not conditioned and burnt correctly, a ship can experience an increased amount of engine failures, therefore requiring additional maintenance. Diesel and fuel oil engines typically require a fuel with a viscosity of 10–14 cSt to operate efficiently and minimize the maintenance schedules. With varying feed-stock quality, controlling the viscosity of the fuel just before it enters the engine for burning becomes important.

To control or change the fuel viscosity, heaters situated on a skid near the engine heat the fuel to precondition its viscosity, temperature range, pressure, and flow rate. Historically, a set temperature was used to control the viscosity of the fuel, but this proved to be inefficient and inaccurate. Viscosity control modifies the heat put into the fuel in order to keep the engine operating efficiently—with the control point typically set to12 cSt.

Challenge

A capillary viscosity meter has traditionally been used to measure viscosity for these applications. However, these instruments have reliability issues because of the large number of moving parts and sensitivity to vibration. Also, capillary meters only measure dynamic viscosity in cP, not kinematic viscosity. If the fuel density changes, the capillary meters cannot detect this.

One ship was having to perform maintenance on its capillary meter every 4 to 6 weeks and, additionally, the meter frequently had to be recalibrated and cleaned. The ship was seeking a solution that would reduce its maintenance costs and spare parts inventory, plus reduce the process down-time required to service the meter.

The meter solution needed to measure viscosity, temperature and density of the fuel while also providing a level of reliability that comes from a self-cleaning design with no moving parts. Because the environment in this application is harsh, with fuel temperatures being an average of 284 °F (140 °C) with flow rates of up to 706

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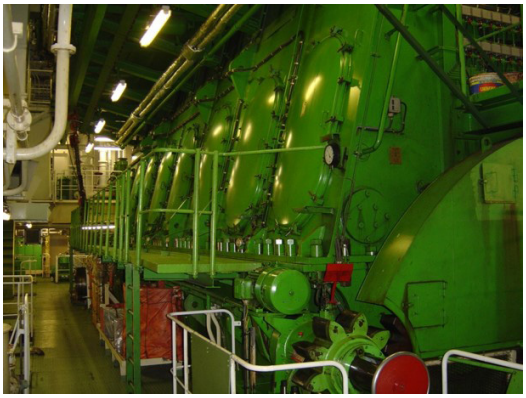
ft3/hr (20m3/hr) and pressure near 145 psi (10 bar), the meter also had to be robust and not easily damaged.

Solution

The ship chose to install a Micro Motion Viscomaster viscosity meter to replace its existing capillary viscosity meter. They chose the Viscomaster for the following reasons:

- Direct, multivariable measurement of viscosity, density and temperature
- High measurement accuracy of direct kinematic measurement to ±0.2 cSt
- Compact, rugged, and vibration insensitive design that requires low maintenance
- The availability of a viscosity meter replacement kit that allowed the ship to replace the meter without changing its existing pipework

After the installation of the Viscomaster viscosity meter, the ship reduced its maintenance costs and spare parts holding, and increased its process up-time. Additionally, because of the availability of a meter replacement kit, the ship reduced the necessary installation costs in updating to the latest technology in viscosity meters. The more reliable viscosity control of the Viscomaster optimized the fuel combustion, reducing the risk of engine wear. With the reduced servicing and maintenance required, the ship also saw additional savings in labor costs.



Installation of a Viscomaster meter at the Viscobooster unit (VBU) of the heater control in a ship's engine