Panametrics
a Baker Hughes business

Application note

# Lubricating oil flow measurement in turbines

**Benefits:**

- Portable, Non-intrusive and versatile solution
- Easy and fast to install
- Reliable and accurate liquid flow measurements
- Field PT900 performance demonstration possible

| Product Name | Density at 150C kg/L | Flash Point Open OC | Pour Point OC | Viscosity at 400C CST |
|---|---|---|---|---|
| Shell Turbo Oil CC 46 | 0.890 | 222 | -12 | 46 |
| Relative density | 0.858 (15 °C / 59 °F) | | | |
| Density | 858 kg/m³ (15 °C / 59 °F) \| Method: IP 365 | | | |


## Summary

A combined cycle thermoelectric plant in Spain with two gas turbines and one steam turbine contacted Panametrics, a Baker Hughes business upon observing a leak and later an obstruction in the lubricating oil supply lines to a turbine. In these lines, a pressure indicator allows them to detect a potential leak when the pressure drops but they are unable to notice if there is an obstruction to the lube oil supply. Taking flow measurements in different points helped them to identify the location of the leaks or obstructions.


## Application

Flow measurement in different points at the oil supply inlet lines to the turbine:

- Lubrication oil
- Temperature: 45-50°C (113-122°F)
- Pipe material: 316L stainless steel
- Diameter: 1" Sch 80 (4.55 mm wall thickness)

## Challenge

A turbine self-starting system requires a specific amount of lube oil flow. The oil-supply guarantees a small oil film inside the bearing, reducing friction. The oil also takes away the heat dissipated inside the bearing.

Limited supply of oil will increase friction. Temperature will rise and eventually result in bearing damage causing an unexpected stop and the need to overhaul the entire turbine. A main pump fills lube oil to different lines and if one of these lines are clogged or has a leak, the required lube oil will not get to these locations. The inlet lube oil lines have pressure indicators but if they measure pressure before the obstruction, they will not notice the obstruction.

## Solution

A portable flow meter measures flows at different locations without stopping the process resolving this issue. The Panametrics team demonstrated the TransPort PT900 with the CF-LP transducers to quickly measure the lube oil flow at different points on these small lines.

The maintenance Department was impressed by the intuitive interface as well as the easy and quick way to setup the meter.

After the demonstration, the maintenance team realized the benefits of having such a portable flow meter and its usability for other applications within their plant. The customer purchased the TransPort PT900 and has been using it on these lube oil measurements and has increased the turbine availability to increase production. They have also used the meter for other liquid lines that they operate, and the monitoring results are reviewed by their quality control department on a regular basis.


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