



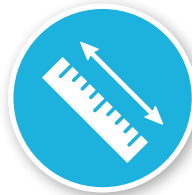
FLOW MEASUREMENT OF DIESEL, ETHANOL, GASOLINE, LPG AND MARINA FUEL ON 6 TO 12 INCH PIPES



Liquid Pipeline

“Flexim was a perfect solution due to easy installation and no need to cut the pipe. One instrument needed to be relocated because the LPG at the first point was not on the liquid phase, so in a few minutes another good measurement point was found without any problem.”

Otaniel Galvão,
Automation Engineer,
Docas do Pará



Measuring Task

Accurate flow measurement for customer billing at off loading port

Billing customers for fuel from ships at an offloading port can be challenging due to a number of factors. However, one of the main headaches for operators is the accurate measurement of fuel that is delivered from the ship to the port, as this requires specialist equipment and trained personnel to make sure that precise measurements are recorded.

Relying on customer measurements for billing, Docas do Pará was looking to introduce their own system of measurement to bill the customers more accurately, according to suitably reliable and accurate flow measurement technology.

Totalling 26 F721GP units, with 21 units inside of Docas do Pará and 5 units at the entrance, Flexim’s reliable flow measurement solution would allow operators to be in complete control of the total amount of fuel delivered to the customers, and not be entirely dependent on these customers’ own reported measurements.

Docas do Pará only utilizes pipes that measure 6, 8, 10 and 12", and the combustibles present are diesel, ethanol, gasoline, LPG and marina fuel, with each pipe having exclusively one fluid type flowing through it.



Solution

With no time for process interruption, the 26 F721GP flowmeters were efficiently installed by Flexim to deliver crucial information including mass flow, volumetric flow rate, density and temperature of the process. Completely non-invasive, and therefore offering no risk of contamination, the flowmeters work by using ultrasonic waves to measure the flow rate of the fluid within the pipe. With two transducers securely fixed to the outside of the pipe with a permanent clamp fitting, one transducer emits ultrasonic signals into the fluid, while the other one receives it. Measuring the time it takes for the signal to travel between the two transducers enables the velocity of the fluid to be calculated.

At present the Docas do Pará project is a pilot, with the customer indicating that there are at least seven further points of measurement where clamp-on ultrasonic flowmeters can be installed in the not too distant future.

In the Brazilian market, there are many more ports and docks where it will be possible to replicate this non-invasive, cost-effective system of measurement. The customer is extremely satisfied with the accurate and reliable permanent flow measurement solution provided by Flexim, not least because of the non-intrusive nature of the ultrasonic clamp-on technology and ease of installation.



View of ships' stop. There are two positions for simultaneous delivery. From the ship to the first measurement point is 500 meters and to the second is 2 kilometres.



Measurement points next to the ships' stop. Installations without cutting pipes and without process interruption. This measurement point comprised 10 pipes with dimensions between 8" and 10". M and K transducers were used for this application.



Installation of 10 meters next to the rear of the port. Every meter has a temperature probe enabling the customer to calculate the density of the products.



10 meters installed at the entrance to Docas do Pará. This is the final measurement point before the fuels are delivered to the end customer. These meters provide the key information needed to compare with the customer's reference meter.

Measuring Points and Instrumentation

Pipeline	4 x 12" carbon steel – F721GP + K
	9 x 6" carbon steel – F721GP + M
	6 x 8" carbon steel – F721GP + M
	7 x 10" carbon steel – F721GP + K
Medium	Diesel, ethanol, gasoline, LPG and marina fuel
Measuring Device	F721GP

Advantages

- Easy installation without process interruption
- More than one variable, such as volumetric flow rate, density and temperature, in one single piece of equipment
- Possible upgrade in case of multi product in one pipe – HPI
- Different pipe sizes accommodated using one pair of transducers

Customer



Established in 1967 and located in Belém in Pará state, one of Brazil's busiest and most important ports, Docas do Pará is dedicated to supporting the Oil and Gas industry of Brazil.

The port of Belém encompasses a territorial area of 333,297.22 m², with this territory consisting of asphalted and illuminated traffic lanes used for cargo handling. The country's ports contribute more than 90% of Brazil's trade in terms of volume, so are of crucial economic importance.

Docas do Pará is responsible for receiving the fuel delivered by ships to this principal commercial port, and then distributed to companies including Petrobras, Raizen and Vibra.

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