

Un Artículo Técnico de Aplein Ingenieros S.A.

On line viscosity measurement in fuel oil blending

O One of the most important parameters in fuel oil is the evaluation and control of viscosity in blending applications.

C Fuel oil is sold with a viscosity specification (measured in cSt) under standard conditions and normally at 100° C.

I On-line viscosity measurement is a great advantage in ensuring the product quality and efficient plant operation. Most manufacturers use capillary viscosimeters, thermostatically controlled at 100° C to carry out this measurement.

C The operational principle of a capillary tube viscosimeter is based on the property of a fluid passing through a horizontal tube with a Reynolds number of less than 2,100, in which the pressure drop is due to the viscous force on the wall of the capillary and is therefore proportional to the viscosity. Among the disadvantages of this method is that any suspended particle in the liquid can interfere with the measurement or block the capillary. It is therefore normally necessary to use a filter. The use is also limited to Newtonian products, the response time is long with a high maintenance requirement and the pressure drop depends on the flow.

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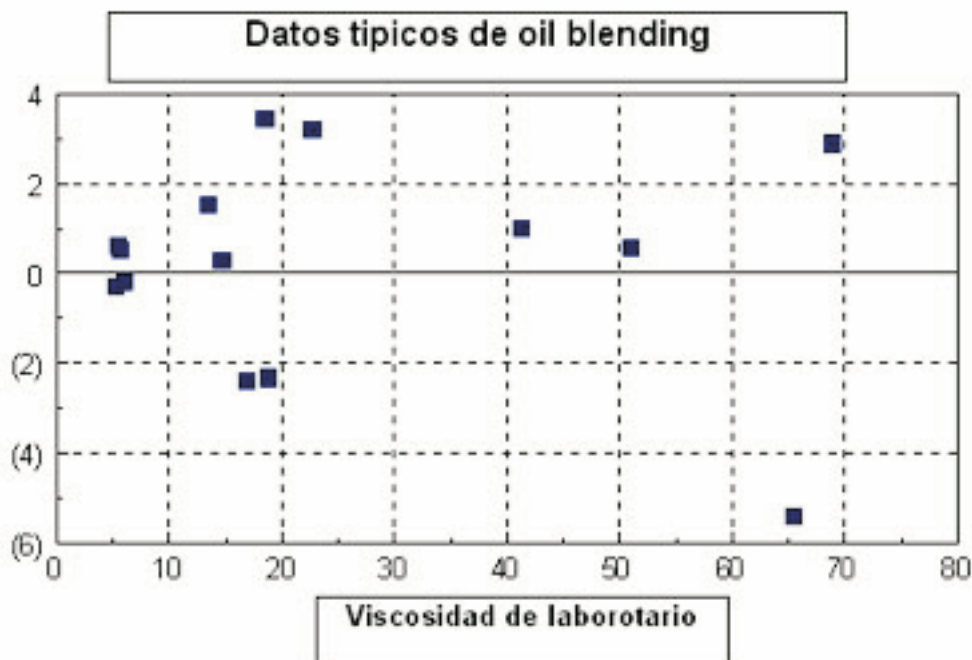


Fig.1 Conjunto típico de datos

The Solartron viscosimeter, with a vibrational measurement principle, has been shown to be effective in fuel oil blending in numerous applications and in different installations and configurations: from by-pass installations in pipes of 10" and 4" respectively with the flow limited 0.5 m/s, up to installations in the main line in a 2" "T" and with the product flowing at a speed of 3 m/s. Figure 1 shows a group of typical data and the second figure shows the recommended installation. In this particular application, the viscosity varies from 4 to 70 cP at a density of 0.863 g/cc and under ambient conditions.

The major difficulty of these applications is obtaining a standard reading in the laboratory that correlates with the on-line measuring conditions in the transducer. The unit is very stable and has a precision of 0.1 cP.

Other applications use the accurate density signal and the matrix mentioned to obtain the kinetic viscosity under standard conditions.

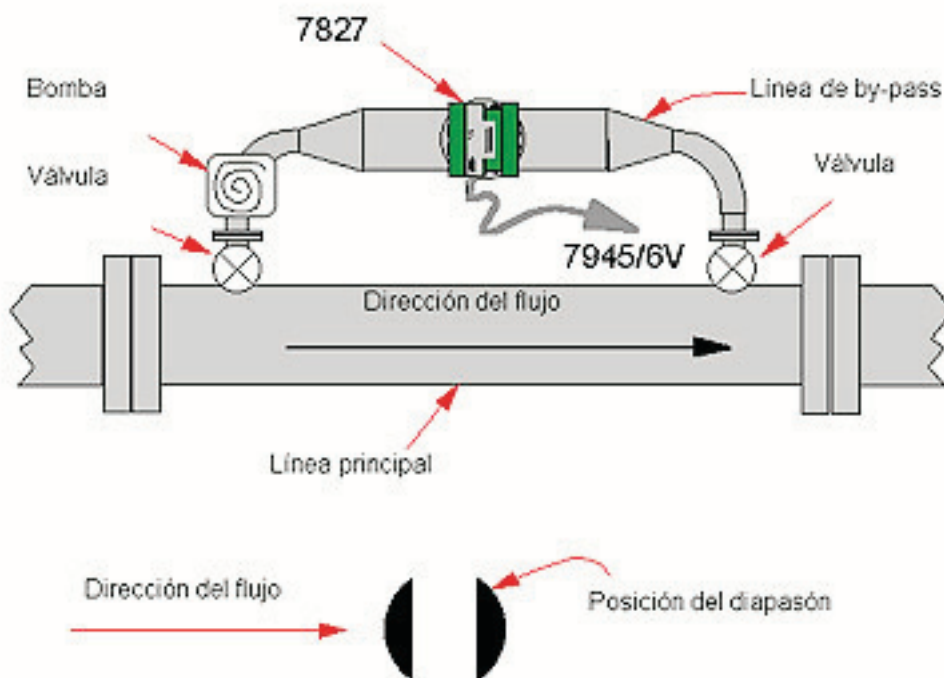


Fig.2 Instalación típica (vista en elevación)