

Automatic Online Viscosity Analyzer for the Petroleum Industry

SOFRASER

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One Issue

Viscosity at reference temperature is required when:

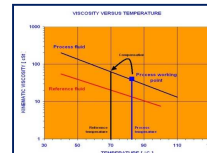
- The effect of variable process temperature must be eliminated
- Viscosity has to be measured at a reference temperature
- Viscosity is correlated to another property of the product
- The process temperature is much higher than the working (reference) temperature of the end product

Three Solutions

Process viscometer with temperature compensation

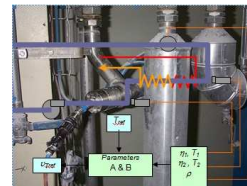
- Viscometer continuously measures the viscosity at process temperature (near T_{Ref})
- Processor calculates the viscosity at reference temperature

$$h(P,TR) = h(P,TP) \times [h(R,TR) / h(R,TP)]$$



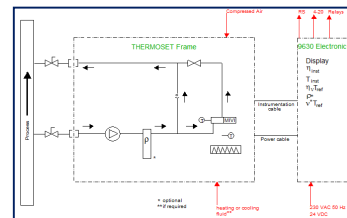
Dual Process viscometer with interpolation

- Viscometer 1 continuously measures the viscosity at T_1
- Product is cooled or heated
- Viscometer 2 continuously measures the viscosity at T_2
- Processor calculates viscosity at end-user determined T_{Ref}



Analyzer at reference temperature

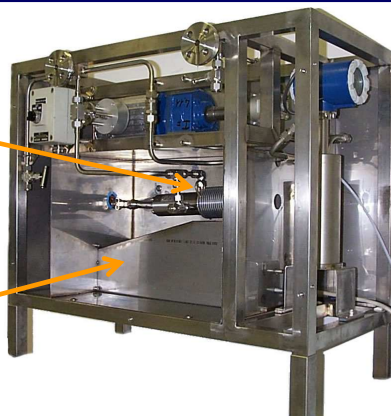
- The measurement is made at the actual T_{Ref} regardless of product behavior
- The correlation to ASTM D-445 standard can be done directly
- Accuracy is induced by the measuring principle



Thermoset MIVI System

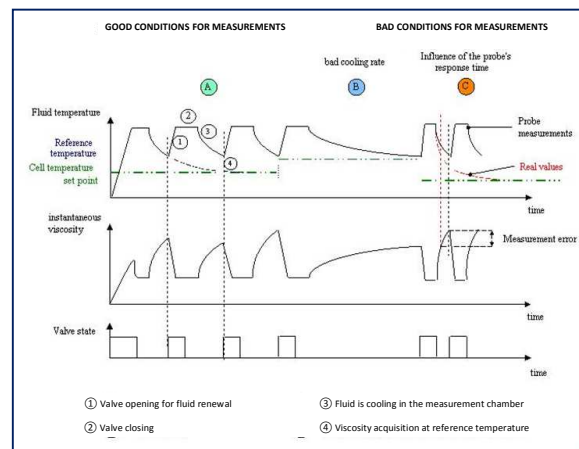
Integrated measuring chamber:
Product sample is isolated in measuring chamber (No bath or oven)

Controlled cooling or heating module:
Takes sample to T_{ref} and memorizes the measurement

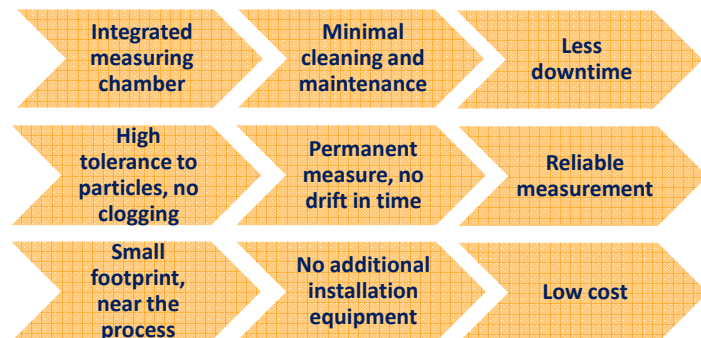


• **Viscosity Index**
according to ASTM D2270-04

• **Density measurement**
For kinematic viscosity



Results



Benefits

Low maintenance

Efficient analysis

Increased production

References / Sources:

ASTM D445-11a: Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids
 ASTM D2270-04: Standard Practice for Calculating Viscosity Index From Kinematic Viscosity at 40 and 100°C
 Invention patent n° FR2 921 726: « Method and system for determining the viscosity of a product »
 Invention patent n° FR2 911 188: « Procédé et système mettant en œuvre un élément oscillant pour déterminer les caractéristiques physiques d'un produit »

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