

# Measuring the Vapor Pressure of High Pour Point Crude Oils

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## 1. Problem

Heavy and viscous crude oils can have a pour point of 30–35°C. The vapor pressure of these viscous crude oil has to be measured with diligence, to prevent clogging and wax building inside the analyzer. As it is very important to heat the sample and keep it liquid during testing, sample temperature should be well above the pour point and a standard filling temperature of 20°C cannot be used.

## 2. Procedure

- **Syringe filling from open bottle, measuring at 50°C**

This procedure is recommended only for dead crude oil samples, that do not release gases when exposed to the atmosphere or during heating:

- a. Close the sample bottle and put it into a waterbath.
- b. Heat the sample bottle to at least 5°C above the pour point. If the pour point is 35°C, it is recommended to heat the sample bottle to at least 40°C. During rinsing and filling, the sample temperature in the syringe will drop. To prevent clogging, a 5°C temperature safety margin is required.
- c. Set the analyzer filling temperature to 50°C.
- d. Quickly collect 10 mL sample with the syringe and attach it to the analyzer.
- e. Immediately run a D6377 crude oil measurement at 50°C.
- f. After measurement rinse the analyzer either with a light gasoline or toluene.

- **Filling from Floating Piston Cylinder (FPC), measuring at 50°C**

To prevent outgassing of crude oil samples before or during heating, the use of a Floating Piston Cylinder is recommended:

- a. Connect the FPC with the analyzer.
- b. Put the FPC into a waterbath.
- c. Heat the waterbath and the FPC to the filling temperature (e.g. 50°C).
- d. Set the analyzer filling temperature to 50°C.
- e. When the temperature of the FPC is 50°C, open the outlet valve.
- f. Run a D6377 crude oil measurement at 50°C.
- g. Close the FPC valve and disconnect the FPC from the analyzer.
- h. After measurement rinse the analyzer either with a light gasoline or toluene.

### 3. Summary

Measuring sticky and viscous crude oils with a high pour point is a very challenging task for any laboratory. The above procedures can be used to achieve good results when testing the vapor pressure of crude oil for transportation. Dilligent sample heating and analyzer rinsing is of utmost importance to achieve good results and to prevent damage done to the analyzer.

**NOTE:**

Please note that according to ASTM D6377 method, results may be converted to ASTM D323 RVP only if the measurement was performed at 37.8°C.



**NOTE: Cleaning directly after each measurement with gasoline or toluene is of critical importance, to prevent solidification of crude oil components inside the analyzer!**