

## Viscometer in Oil and Lubricant Applications

PCE Americas Inc.  
711 Commerce Way  
Suite 8  
Jupiter  
FL-33458  
USA  
From outside US: +1  
Tel: (561) 320-9162  
Fax: (561) 320-9176  
info@pce-americas.com

PCE Instruments UK Ltd.  
Units 12/13  
Southpoint Business Park  
Ensign way  
Hampshire / Southampton  
United Kingdom, SO31 4RF  
From outside UK: +44  
Tel: (0) 2380 98703 0  
Fax: (0) 2380 98703 9  
info@pce-instruments.com

[www.pce-instruments.com/english](http://www.pce-instruments.com/english)  
[www.pce-instruments.com](http://www.pce-instruments.com)

### Viscometry of oils and emulsions

In all industrial application fields, in which oils, gels and emulsions are pumped, stirred and filtered as well as are treated physically and chemically in product circulations, the flowability of these substances plays a very important plant engineering role. An inevitable result is that the viscosity of these substances should be controlled and documented at different single production stages.



## Viscometry of mineral oils and lubricants

The viscosity of an oil describes its flowability and lubricity and is the most important feature of motor oil. This physical feature is determined by the length and the chemical composition of the oil molecule.

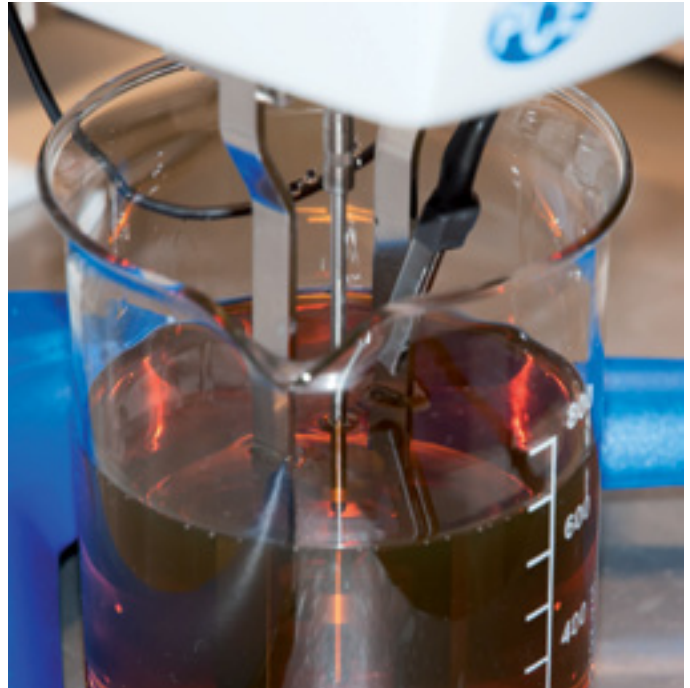
In technical fields by means of mixing the oils and addition of the additives the viscous properties of the machine and gear oil are optimized in a desired way. Thus viscosity is a very important parameter of the quality control of the oil in the production process (done by a hand or in-line viscometer).

The service life of mineral oils is limited because of the mechanical use and the contamination during the use. Also in these cases, the viscosity measurement is an important control parameter for evaluation of the operational capability of the used oil. For this, the low viscosities of the used oil are compared with the higher viscosity of the starting material.

Viscosities depend on the temperatures a lot. Since lubricating oils get heated the other parameters for evaluation of the usability are important. These parameters derive from the viscosity measurement of the oil. Viscosity index is as a rule a parameter for evaluation of the viscosity-temperature dependence. So, the viscosity of an

oil is determined at the temperatures from 40 ° C to 100 ° C and the viscosity index is calculated. The higher the viscosity index is, the less the temperature of the oil influences the viscosity of an oil. By default, engine and gear oils have a high viscosity index.

Motor oils are classified within SAE-viscosity ranges. To determine the SAE viscosity range, it is required to know the viscosity and the density of the oil at different minus-temperatures and at 100°C Capillary and rotation viscometer play an important role for the determination of the viscosity ranges.



## Viscometry of used frying fats

As against to the features of the motor oils, the viscosity increases in the process of use when it goes about edible oils and frying fats. It happens through the chain extensions (polymerization) of the fat molecules when heated. This chemical change brings inevitably to the increase of the viscosity.

## Viscometry of paints and varnishes

Paints and varnishes are used in many various ways. Depending on the processing procedure (painting rollers, spraying, dipping) different viscosities are required which can be adjusted by adding dissolvent and additives.

To evaluate the processing viscosity of the paints and varnishes DIN flow cups (or digital viscometers) play an important role. Thus, exactly 100 ml paint should be filled into the DIN measuring cup with the discharge opening 4mm in diameter and the flow time at the processing temperature should be determined. Spray paints have got processing viscosity of 23 seconds/DIN 4mm.