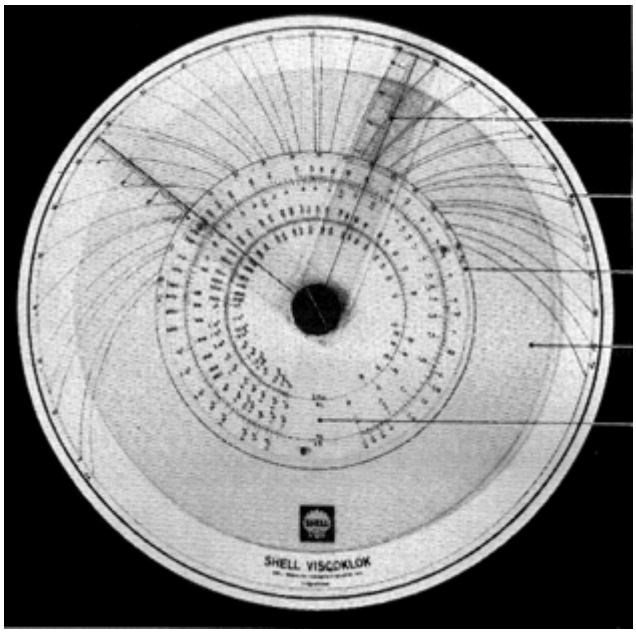
MANUAL

FOR THE

SHELL VISCOKLOK

1 PURPOSE

When the viscosity of a lubricating oil is known at two temperatures, one can read, after drawing a straight line on special-purpose plotting paper, the viscosity at other temperatures.
Without drawing and without using plotting paper the same data can be obtained with the Shell Viscoklok.
The viscosities can be read from the Shell Viscoklok in the four usual units and in temperatures given in °C and °F. If the viscosity is only known at one temperature, one can use the Shell Viscoklok to convert the viscosity at that temperature to other units.



2 MAIN PARTS AND DESIGNATIONS

one of two cursors with hairline and mm scale.

°F temperature scale (in black)

°C temperature scale (in red)

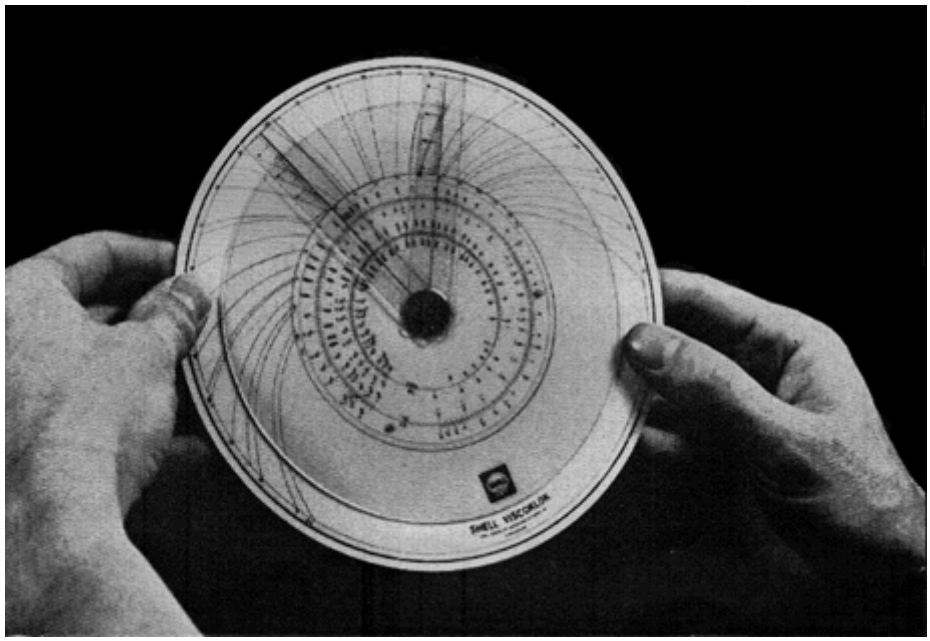
temperature ring with temperature lines

viscosity disk with 4 scales

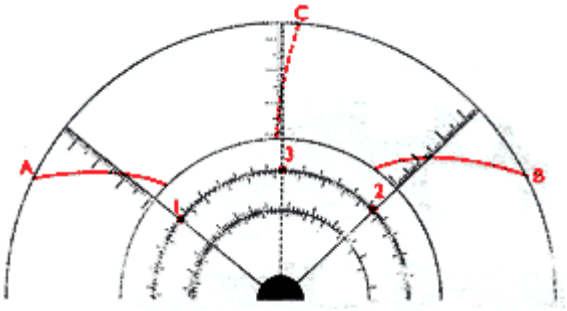
SSU	= Sec. Saybolt Universal
R.I	= Sec. Redwood I
°E	= degrees Engler
cS	= centiStokes

3 HOW DOES ONE WORK EASILY WITH THE INSTRUMENT ?

- fingertips on the back of the instrument
- designations SSU, R.I, etc. aimed towards you
- thumbs on the temperature ring
- turn the temperature ring around the viscosity disk by moving both thumbs in the same rotational direction while slightly pressing the temperature ring.



4 PRINCIPLES OF OPERATION



Known are: viscosity 1 at temperature A
viscosity 2 at temperature B

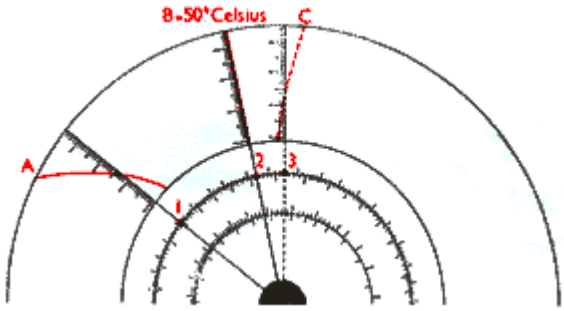
Asked: viscosity at temperature C

- place the hairlines on the viscosities 1 and 2
- rotate the temperature ring so that the hairlines cross the temperature lines A and B at equal radii
- remember this radius or write it down (x mm)
- rotate one of the cursors so that its hairline also crosses C at radius x mm
- the required viscosity 3 can be read in the desired units from the viscosity disk

Note:

The viscosity of the given oil at other temperatures can also be found by letting the hairline cross the temperature lines at x mm.

5 SIMPLER METHOD



When one of the viscosities is known at 50 °C, the temperature ring can be set more easily than in the case discussed above.
(In this example viscosity 2 is known at 50 °C)

In the previous case one had to rotate until both hairlines crossed temperature lines at equal radii, which meant that one had to look at two places several times, but now it works as follows:

- place the hairlines on 1 and 2
- rotate the temperature ring so that the hairline at 2 coincides with the 50 °C line
- read the radius at which the other hairline crosses A
- proceed as under 4

6 EXAMPLE 1

Example of the method explained under 4 (Principles of operation).

The following viscosities are known: 1700 Sec. Redwood I/70 °F and 1.67 °Engler/100 °C

Viscosities asked: Sec. Saybolt Universal/100 °F and °Engler/50 °C

Solution:

- place the hairlines on the given viscosities
- rotate the temperature ring until the hairlines cross the 70 °F and 100 °C lines at equal radii
- read this radius. It is 30 mm
- rotate one of the cursors until the 100 °F line crosses the hairline at 30 mm

- read the viscosity in SSU. It is 540 /100 °F
- rotate one of the cursors until the hairline coincides with the 50 °C line
- read from the °Engler scale the viscosity (7.5 °E/50 °C)

7 EXAMPLE 2

Example of the "Simpler Method" explained under 5.

Imagine you are using in hydraulic systems the "SHELL TELLUS" oil 27 with the following viscosities: 10.5 °E/20 °C and 3 °E/50 °C.
You want to find out if this oil can also be used for a machine imported from America, for which a hydraulic oil with a viscosity of 150-170 SSU/100 °F is prescribed.

- place the hairlines on 10.5 °E and 3 °E
- rotate the temperature ring until the 50 °C line coincides with the hairline on 3 °E
- read the radius at which the other hairline crosses the 20 °C line (16 mm)
- the intersection of the 100 °F line with one of the hairlines at a radius of 16 mm tells us that the viscosity is 160 SSU/100 °F and that the therefore "SHELL TELLUS" oil 27 can be used for the purpose intended.

8 SOME GENERAL REMARKS

A. The normal viscosity-temperature relationship does not hold when the oil temperature approaches the freezing point. Therefore a viscosity value found on the Shell Viscoklok for a temperature slightly above the freezing point differs from the actual value. Please adhere to the following rule:

Read no viscosity values for temperatures less than 10 °C above the freezing point

B. If you need - for instance for bearing calculations - the viscosity expressed in centiPoises (cP), use the Shell Viscoklok to determine the viscosity in centiStokes at the right temperature and multiply the obtained value by the density S.G. of the oil at the same temperature, *i.e.*: cP = cS x S.G.

9 DATA ON SHELL LUBRICANTS

To help you determining all desired viscosities of Shell lubricants a list has been added stating for our oils:

- the viscosity in °Engler at 20 °C and 50 °C or at 50 °C and 100 °C. You can therefore always use the "Simpler method"
- the freezing point in °C
- the density at 15/4 °C

From the latter data and the accompanying density-temperature curve you can determine the density at other temperatures.
The viscosity in centiPoises can be calculated as described under 8.

February
1962

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Notes:

1. This Viscoklok manual has been translated from the Dutch language and put into HTML by Andries de Man, as an example of a calculating device which combines elements of a slide rule and a nomogram.
2. The original Viscoklok, of which a picture is available, has a diameter of 18.5 cm and is made of thick plastic. The thing came in a rugged vinyl case, with a separate pocket for the manual and the density-temperature chart. The list with Shell lubricants data is missing.
3. By the way, "klok" is Dutch for "clock".
