

Brief Instructions for use of the Viscosity-Temperature Slide Rule

1. The slide rule can be used for normal multiplication and division with the aid of the C and D scale. In this respect it does not differ from the conventional slide rules.
2. The viscosity scales (Sec. Redwood I, Sec. Saybolt Universal, Centistokes, Engler) permit
 - 2.1 the reading of the equivalent viscosity values at a specific temperature and
 - 2.2 serve the purpose of establishing a rough viscosity-temperature relationship by means of the Centigrade/Fahrenheit scales on the slide.

In order to obtain exact conversion values, the normal viscosity temperature sheets should be used as the slide rule is based on a viscosity index of approx. 75. Consequently deviations will occur with oils having a VI much higher or lower than 75.

Example for 2.1 — Attachment 1

The black line across the cursor runs through the following values on the 4 viscosity scales in the example given:

Sec. Redwood I:	120
Sec. Saybolt Universal:	139
Centistokes:	29
Engler:	4

In this position it is possible, for example, to read direct that 4 E is the equivalent of 120 SRI **at the same temperature**. The temperature scale on the slide is of no importance in this reading; the setting shown in the example ($\sim 34^{\circ}\text{C} = 130^{\circ}\text{F}$) is arbitrary. The slide could thus be removed from the rule without influencing the reading of the various equivalent viscosity units as this reading **is not based on a specific temperature**.

Example for 2.2 — Attachment 2

A Heavy Fuel Oil of 1500 Sec. Redwood I at 100°F is to be pre-heated in such a way that the viscosity at the injection nozzle is 2.4 Engler. The procedure is as follows:

- 1) The centre line of the cursor is set at 1500 on the Sec. Redwood I scale (top scale on front of the slide rule).
- 2) The slide is moved to the right until the figure 100 on the Fahrenheit scale is covered by the black line on the cursor.
- 3) The cursor is then moved to the left until the black centre line covers the figure 2.4 on the Engler scale.
- 4) The black centre line of the cursor now covers the following values: 2.4 E, 15.4 cSt, 238°F , $\sim 115^{\circ}\text{C}$, 80 SSU and 70 SRI.

The solution to the problems set is thus:

The Heavy Fuel Oil must be pre-heated to 238°F or $\sim 115^{\circ}\text{C}$ in order to reach a viscosity of 2.4 E.

