

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.

