## 2.5 COMPRESSION RATIO

It is impossible for the rotary engine due to its mechanism to obtain a higher compression ratio than the theoretical compression ratio that is expressed by the ratio of the maximum to minimum values of the volume of the working chamber as obtained in 2.4. This is one of the major problems in designing a diesel rotary engine

### 2.5.1 THEORETICAL COMPRESSION RATIO

The theoretical compression ratio $\varepsilon_{th}$ is

$$\varepsilon_{th}=\frac{V_{max}}{V_{min}}$$

$$=\frac{2eR\cos\varphi_{max}+\left(\frac{2}{9}R^2+4e^2\right)\varphi_{max}+\frac{\pi}{3}e^2+\frac{3\sqrt{3}}{2}eR}{2eR\cos\varphi_{max}+\left(\frac{2}{9}R^2+4e^2\right)\varphi_{max}+\frac{\pi}{3}e^2-\frac{3\sqrt{3}}{2}eR}$$

$$=\frac{2K\cos\varphi_{max}+\left(\frac{2}{9}K^2+4\right)\varphi_{max}+\frac{\pi}{3}K+\frac{3\sqrt{3}}{2}K}{2K\cos\varphi_{max}+\left(\frac{2}{9}K^2+4\right)\varphi_{max}+\frac{\pi}{3}K-\frac{3\sqrt{3}}{2}K} \quad \cdots\cdots(2.31)$$

As being clear from this, the theoretical compression ratio $\varepsilon_{th}$ is determined only by the trochoid constant $K$. **Fig. 2.10** shows the relation between $K$ and the maximum angle of oscillation and the theoretical

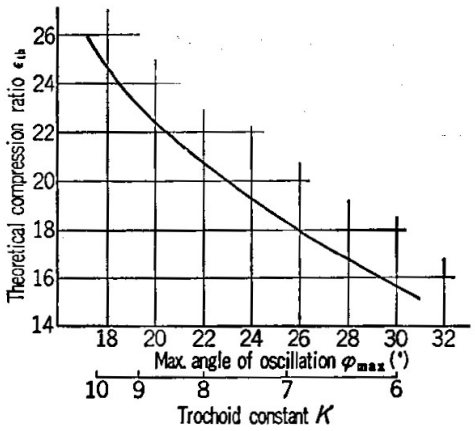



**Fig. 2.10** Relation between trochoid constant and max. angle of oscillation and theoretical compression ratio