

ABSTRACT

An ideal positive displacement flowmeter which has a pair of helical gears given by using oval pitch curve as reference rack tooth profile, with the tooth height ratio of the reference rack tooth profile even with a small number of teeth being set to $\pi m/4$ which is a logical limit for the tooth height ratio of a one-point continuous contact tooth profile and which has no confinement phenomenon between tooth profiles. The positive displacement flowmeter has a pair of helical gears (1, 2) in a casing (3). The reference rack tooth profile of the pair of helical gears (1, 2) is an oval pitch curve of two or less leaves. The moving radius of the oval pitch curve is expressed by $\rho = a/(1 - b \cos n\theta)$, where ρ is a moving radius which is a distance between the center of rotation and the oval pitch curve, "a" is a similarity factor, "b" is a degree of flatness, n ($n \leq 2$) is the number of leaves, and θ is an argument. The tooth height ratio (h) can be expressed by $h = a/(1 - b) - g_0$, where g_0 is a distance between the poles of the oval pitch curve and the pitch line, wherein by $g_0 = a \cos \theta_0 / (1 - b \cos n\theta_0)$. Values for the similarity factor "a", the degree of flatness "b", and the distance g_0 are determined so that the tooth height ratio (h) may be $\pi m/4$.