

Объем отливки

Найдем объем отливки, с учетом литейных уклонов и припусков:

$$V1 := \frac{1}{4} \pi 23 \left((451 + 4)^2 - (357 - 4)^2 \right)$$

$$\ln[2] := V2 := \frac{1}{4} \pi (75 - 59 + 7) \left(451^2 - 357^2 \right)$$

$$\ln[3] := V3 := \frac{1}{4} \pi (59 + 4) \left(665^2 - 443^2 \right)$$

$$\ln[9] := V4 := \frac{1}{4} \pi (50 - 10)^2 75$$

$$\ln[5] := V5 := \frac{1}{4} \pi 443^2 (59 + 4) - \int_0^{59} \pi \left(210^2 - (y + 23 - 4)^2 \right) dy$$

$$\ln[6] := V6 := \pi (210 - (23 - 4))^2 \left(210 - \frac{210 - (23 - 4)}{3} \right) - \pi (150 - (23 - 4))^2 \left(150 - \frac{150 - (23 - 4)}{3} \right)$$

$$\begin{aligned} \ln[21] := Vkon := & \frac{1}{12} (\pi (59 + 4)) \left((2 (59 + 4) \tan(1.^\circ) + 665)^2 + 665 (2 (59 + 4) \tan(1.^\circ) + 665) - 2 665^2 \right) + \\ & \frac{1}{12} (\pi 23) \left((2 23 \tan(1.5^\circ) + 415)^2 + 415 (2 23 \tan(1.5^\circ) + 415) - 2 415^2 \right) + \\ & \frac{1}{12} (\pi (75 - 59 + 7)) \left((2 (75 - 59 + 7) \tan(1.5^\circ) + 578)^2 + 578 (2 (75 - 59 + 7) \tan(1.5^\circ) + 578) - 2 578^2 \right) + \\ & \frac{1}{12} (\pi (75 - 59 + 7)) \left(- (221.5 - 2 (75 - 59 + 7) \tan(3^\circ))^2 - 221.5 (221.5 - 2 (75 - 59 + 7) \tan(3^\circ)) + 2 221.5^2 \right) \end{aligned}$$

$$\ln[26] := Vo = V1 + V2 + V3 - 4 V4 + V5 + V6 + Vkon$$

$$\text{Out}[26] = 2.80817 \cdot 10^7$$

Отсюда вычисляем КИМ:

$$\ln[28] := V / Vo$$

$$\text{Out}[28] = 0.904034$$