

Kräfte am Zahnrad

Umfangskraft gl. 21.70

Radialkraft gl. 21.71

~~Umfangskraft~~ gl. 21.72

Axialkraft 21.72

Zahnrad 1:

Umfangskraft: $F_{t1} = \frac{2 \cdot T_1}{d_1} = \frac{2 \cdot 50 \text{ Nm}}{67,41 \text{ mm}} = 1,489 \text{ N}$

Radialkraft: $F_{R1} = \frac{F_t \cdot \tan \alpha_n}{\cos \beta} = \frac{1,489 \text{ N} \cdot \tan 20^\circ}{\cos 20^\circ} = 0,579 \text{ N}$

Axialkraft: $F_{a1} = F_t \cdot \tan \beta = 1,489 \text{ N} \cdot \tan 20^\circ = 0,549 \text{ N}$

Zahnrad 2:

$$F_{t2} = -F_{t1} \quad F_{R2} = -F_{R1} \quad F_{a2} = -F_{a1}$$

Zahnrad 3:

$$F_{t3} = \frac{2 \cdot 50 \text{ Nm} \cdot 3,381}{74,49 \text{ mm}} = 4,549 \text{ N}$$

$$F_{R3} = \frac{4,549 \text{ N} \cdot \tan 20^\circ}{\cos 20^\circ} = 1,769 \text{ N}$$

$$F_{a3} = 4,549 \text{ N} \cdot \tan 20^\circ = 1,659 \text{ N}$$

Zahnrad 4:

$$F_{t4} = -F_{t3} \quad F_{R4} = -F_{R3} \quad F_{a4} = -F_{a3}$$