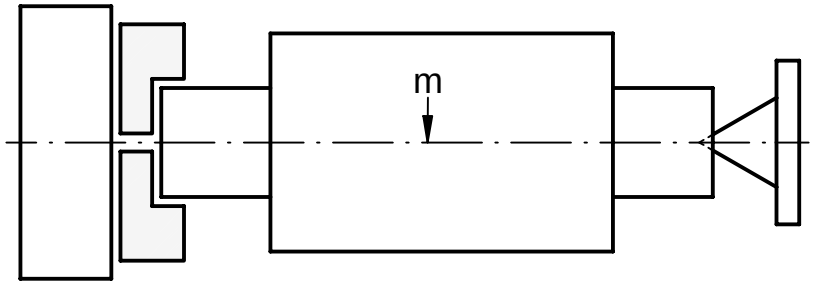
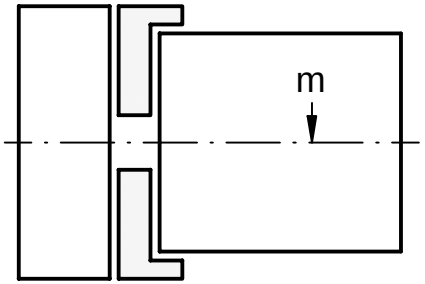
# Dimensioning- Calculation for Power Clamping Screw MSP / MSPD

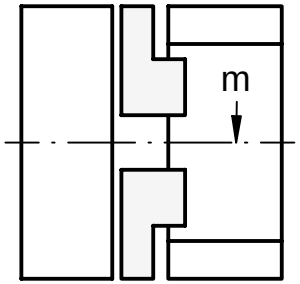
case 1:
$F_m = \frac{m}{2}$



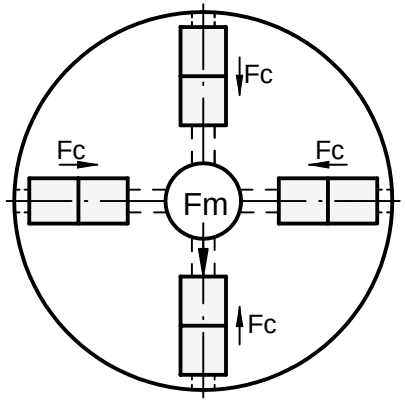

case 2:
$F_m = m$



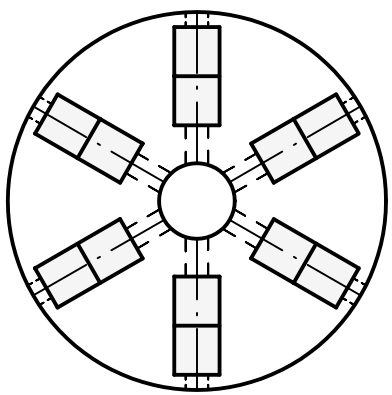

case 3:
$F_m = m$



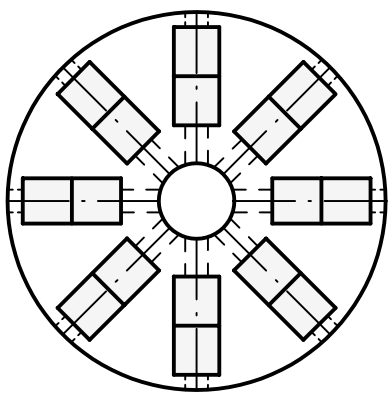

n=4 → $f_n$ =1




n=6 → $f_n$ =1,5



n=8 → $f_n$ =2



| MSP size | $F_{sn}$ [kN] external / internal | $F_{smax.}$ [kN] |
|---|---|---|
| 65 | 150 / 100 | 250 |
| 80 | 200 / 140 | 300 |
| 100 | 250 / 180 | 400 |
| 120 | 300 / 220 | 600 |
| 160 | 400 / 300 | 800 |
| 200 | 500 / 400 | 1200 |

The total amount of clamping force and weight of the working piece has to be less than the value of the max. allowed static load "Fs max" :

$$F_{total} = \frac{F_m}{f_n} + F_c \leq F_{smax} \quad \text{or} \quad F_s \text{ max} - F_c^* \geq \frac{F_m}{f_n}$$

* Remark: The clamping force Fc should not succeed the nominal clamping force Fsn of the respective Power Clamping Screw size; reduced clamping force values are permitting a higher workpiece weight. Generally it is to say that Fc = Fsn. Specific application factors (unbalanced mass...) have to be respected.

$F_c$ → required clamping force per Power Clamping Screw [kN]
$F_{sn}$ → nominal clamping force of the Power Clamping screw [kN]
$F_{smax}$ → max. allowed static load [kN]
n → number of Power Clamping Screws per face plat
$f_n$ → load factor (for adversial load distribution)
m → weight of the workpiece [kg bzw. to]
$F_m$ → weight of workpiece in [kN] [1to ≙ 10kN]

Calculation example: max. weight of workpiece: 80 to = 800 kN; case1: Fm = m / 2 = 40to ≙ 400kN; number of Power Clamping Screws: 4→fn =1
necessary clamping force Fc = 300 kN; external clamping → series MSP

According to the clamping force - preselection of type MSP 120: Fs max - Fc = 600 - 300 = 300 kN and Fm / fn = 400 / 1 = 400 kN i.e. the sizing condition of 300 kN > 400 kN is not complied i. e. the next bigger screw size has to be choosen. Checkup with MSP 160: Fs max - Fc = 800 - 300 = 500 kN respectively Fges = 400 + 300 = 700 kN≤ Fs max = 800 kN→ Sizing is OK !