

# POLYGONAXLAR OCH HYLSOR

## POLYGON SHAFTS AND NAVES

### Hålfasthetsberäkning för polygonaxlar

#### Strength calculation for polygon shafts

$T_t$	= Vridmoment (Ncm) Torsional moment (Ncm)	$W_x$	= Axiellt motståndsmoment (cm <sup>3</sup> ) Equatorial moment of resistance (cm <sup>3</sup> )
$\tau$	= Vridpåkning (Ncm <sup>2</sup> ) Torsional strain (Ncm <sup>2</sup> )	$s$	= Navvägens tunnaste del (cm) Thinnest section of hub wall (cm)
$W_p$	= Polärt motståndsmoment (cm <sup>3</sup> ) Polar moment of resistance (cm <sup>3</sup> )	$\sigma_z$	= Dragpåkning (Ncm <sup>2</sup> ) Tension stress (Ncm <sup>2</sup> )
$d_1; d_2$	= Minsta diameter (cm) Minor diameter (cm)	$l$	= Navlängd (cm) Length of hub (cm)
$P$	= Specifikt yttryck Specific contact stress (Ncm <sup>2</sup> )	$A$	= Tvärsnittsarea av profil (cm <sup>2</sup> ) Cross sectional area of profile (cm <sup>2</sup> )
$e_r$	= $\frac{d_1-d_2}{4}$ = Kalkylerat excentriskt värde (cm) Calculated eccentric value (cm)	$dm$	= $\frac{d_1+d_2}{2}$ = Medeldiameter (cm) Mean diameter (cm)
$d_r$	= $d_2+2e$ = Teoretisk diameter (cm) Theoretical diameter (cm)	$J_x$	= Axiellt tröghetsmoment (cm <sup>4</sup> ) Equatorial moment of inertia (cm <sup>4</sup> )
$T_b$	= Böjmoment (Ncm) Bending moment (Ncm)	$J_p$	= Vridning (cm <sup>4</sup> ) Torsion (cm <sup>4</sup> )
$\sigma_b$	= Böjpåkning (Ncm <sup>2</sup> ) Bending stress (Ncm <sup>2</sup> )	$b$	= Navbredd (cm) Width of hub (cm)

Vridmoment:

Torsional moment:

$$T_t = W_p \times \tau$$
$$W_p \sim 0.2 \times d_1^3$$
$$T_t \sim p \times l \left( \pi \times e_r \times d_r + \frac{d_r^2}{20} \right)$$

Böjmoment:

Bending moment:

$$T_b = W_x \times \sigma_b$$
$$W_x \sim 0.15 \times d_1^3$$

Navväggs tjocklek:

Thickness of hub wall:

$$s \sim 0.7 \sqrt{\frac{T_t}{\sigma_z \times b}}$$

Tvärsnittsarea:

Cross sectional area:

$$A \sim \frac{\pi \times d_m^2}{4}$$

### Beräkningar för P4c polygonprofil enligt DIN 32712

#### Calculations for P4c polygon profile according to DIN 32712

##### Axlar / Shafts

**Torsionspänning**  
Stress due torsion

$$\tau = \frac{T_t}{W_p}$$

$$W_p \sim 0.2 \times d_1^3$$

$$J_p \sim 0.14 \times d_1^4$$

**Böjspänning**  
Contact stress

$$\sigma_b = \frac{T_b}{W_x} = \frac{T_b \times D_1}{2 \times J_x}$$

$$W_x \sim 0.15 \times d_1^3$$

$$J_x \sim 0.075 \times d_1^4$$

**Nav**  
Hubs

$$s = 0.7 \sqrt{\frac{T_t}{\sigma_z \times b}}$$

Navväggs tjocklek,  
approximativ formel

Hub wall thickness  
approximation

**Yttryck**

Contact stress

$$P = \frac{T_t}{l \left( \pi \times e_r \times d_r + \frac{d_r^2}{20} \right)}$$