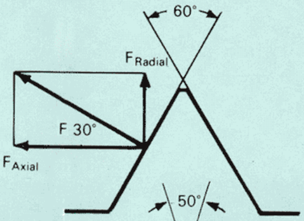
Components of Force

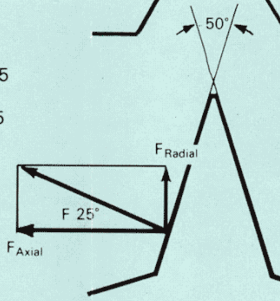
$F_{Axial} = F \cos 30 = \cdot 866\ F$

$F_{Radial} = F \sin 30 = \cdot 5\ F$

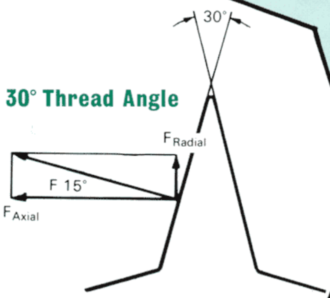


$F_{Axial} = F \cos 25 = \cdot 906\ F$

$F_{Radial} = F \sin 25 = \cdot 423\ F$

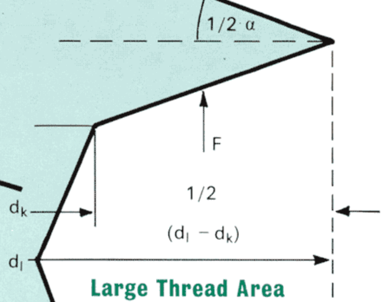


30° Thread Angle

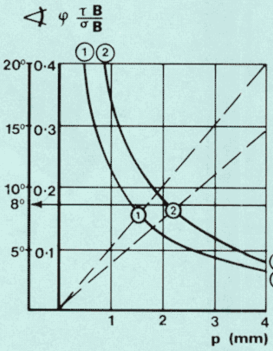


$F_{Axial} = F \cos 15 = \cdot 966\ F$

$F_{Radial} = F \sin 15 = \cdot 259\ F$



Large Thread Area

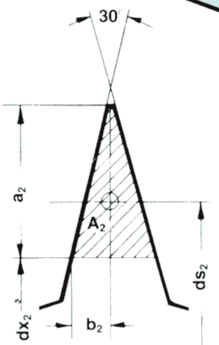


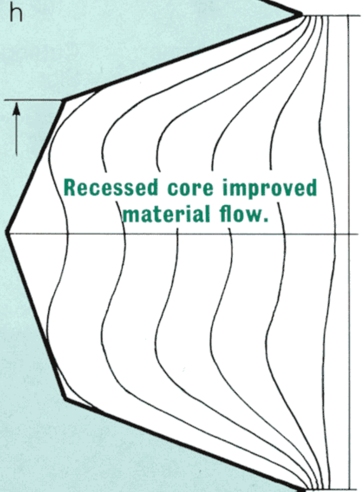
Assembly Stress $\sigma = \frac{F}{E}$

E = Effective Area of Contact between Screw and Thermoplastic

$E = \pi(d_l^2 - d_k^2)$

$\sigma = \frac{F}{\pi(d_l^2 - d_k^2)}$





Recessed core improved material flow.

φ = Thread Pitch Angle

F = Shear Load in the Plastic

= Bending Load on the Screw Thread

A = Shear Area $d_l \cdot \pi \cdot p$

W = Resisting Moment of the Thread Tooth

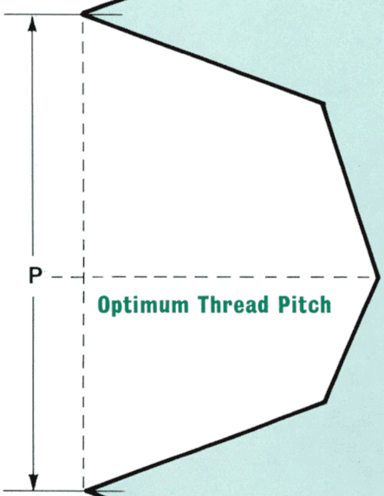
$= h^2 \cdot d_k \cdot \pi = \tan^2 \frac{\alpha}{2} (d_l - d_k)^2 \cdot d_k \cdot \pi$

τ_B = Shearing Fracture Stress

σ_B = Bending Fracture Stress

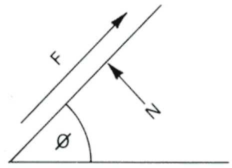
M_b = Point of Screw Failure

$$\frac{\tau_B}{\sigma_B} = \frac{F}{A} \cdot \frac{W}{M_b} \qquad \boxed{\frac{\tau_B}{\sigma_B} = \frac{4\tan^2 \frac{1}{2}\alpha \cdot (d_l - d_k) \cdot d_k}{p \cdot d_l}}$$



Optimum Thread Pitch

Optimum Helix Angle



Influence of Helix Angle
- f = friction force
- N = normal reaction
- Ø = helix angle

The coefficient of static friction $\mu s = \frac{f}{N}$

For limiting static friction $Ø = \tan^{-1}\mu$

With $Ø > \tan^{-1}\mu$ the effect of friction is reduced
With $Ø < \tan^{-1}\mu$ the effect of friction is increased
To calculate helix angle Ø

$Ø = \tan^{-1}\frac{(L)}{\pi d_l}$ Radians

where
- L = lead of screw = N × P
- N = number of threads
- P = pitch
- d_l = major diameter