SPUR GEAR BENDING
BASED ON ANSI/AGMA 2001-D04

$$d_P = \frac{N_P}{P_d}$$

$$V = \frac{\pi d n}{12}$$

$$W^t = \frac{33\,000\,\mathrm{H}}{V}$$

Gear bending stress equation Eq. (14–15)

$$\sigma = W^t K_o K_v K_s \frac{P_d}{F} \frac{K_m K_B}{J}$$

1 [or Eq. (a), Sec. 14–10]; p. 739
Eq. (14–30); p. 739
Eq. (14–40); p. 744
Fig. 14–6; p. 733
Eq. (14–27); p. 736
Table below

Gear bending endurance strength equation Eq. (14–17)

$$\sigma_{\text{all}} = \frac{S_t}{S_F} \frac{Y_N}{K_T K_R}$$

$_{0.99}(S_t)_{10^7}$ Tables 14–3, 14–4; pp. 728, 729
Fig. 14–14; p. 743
Table 14–10, Eq. (14–38); pp. 744, 743
1 if $T < 250°\mathrm{F}$

Bending factor of safety Eq. (14–41)

$$S_F = \frac{S_t Y_N / (K_T K_R)}{\sigma}$$

Remember to compare S_F with S_H^2 when deciding whether bending or wear is the threat to function. For crowned gears compare S_F with S_H^3.

Table of Overload Factors, K_o

	Driven Machine		
Power source	Uniform	Moderate shock	Heavy shock
Uniform	1.00	1.25	1.75
Light shock	1.25	1.50	2.00
Medium shock	1.50	1.75	2.25

Figure 14–17

Roadmap of gear bending equations based on AGMA standards. *(ANSI/AGMA 2001-D04.)*

SPUR GEAR WEAR
BASED ON ANSI/AGMA 2001-D04

$$d_P = \frac{N_P}{P_d}$$

$$V = \frac{\pi d n}{12}$$

$$W^t = \frac{33\,000\,\mathrm{H}}{V}$$

Gear contact stress equation Eq. (14–16)

$$\sigma_c = C_p \left(W^t K_o K_v K_s \frac{K_m}{d_P F} \frac{C_f}{I} \right)^{1/2}$$

1 [or Eq. (a), Sec. 14–10]; p. 739
Eq. (14–30); p. 739
1
Eq. (14–23); p. 735
Eq. (14–27); p. 736
Table below
Eq. (14–13), Table 14–8; pp. 724, 737

Gear contact endurance strength Eq. (14–18)

$$\sigma_{c,\mathrm{all}} = \frac{S_c Z_N C_H}{S_H K_T K_R}$$

$0.99(S_c)_{10^7}$ Tables, 14–6, 14–7; pp. 731, 732
Fig. 14–15; p. 743
Section 14–12, gear only; pp. 741, 742
Table 14–10, Eqs. (14–38); pp. 744, 743
1 if $T < 250°$ F

Wear factor of safety Eq. (14–42)

$$S_H = \frac{S_c Z_N C_H / (K_T K_R)}{\sigma_c}$$

Gear only

Remember to compare S_F with S_H^2 when deciding whether bending or wear is the threat to function. For crowned gears compare S_F with S_H^3.

Table of Overload Factors, K_o

	Driven Machine		
Power source	Uniform	Moderate shock	Heavy shock
Uniform	1.00	1.25	1.75
Light shock	1.25	1.50	2.00
Medium shock	1.50	1.75	2.25

Figure 14–18

Roadmap of gear wear equations based on AGMA standards. *(ANSI/AGMA 2001-D04.)*