



















$$\sigma_{sf}' = 28(\text{Bhn}) - 69 = 2.8 \times 340 - 69 = 954 \text{MPa}$$

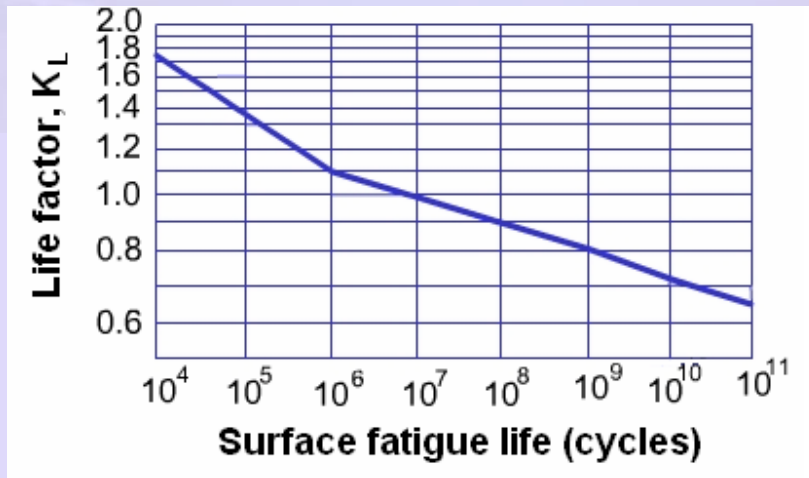
$K_L = 0.9$  for  $10^8$  cycles from Fig.9.2

$K_R = 1.0$ . for 99% reliability from Table 9.10

### SPUR GEAR – SURFACE FATIGUE STRENGTH

**Table 9.15 Surface fatigue strength  $\sigma_{sf}$  for metallic spur gears ( $10^7$  cycle life 99% reliability and temperature  $<120^\circ \text{C}$ )**

Material	$\sigma_{sf}'(\text{MPa})$
Steel	2.8 (Bhn)-69MPa
Nodular iron	0.95 (2.8(Bhn)-69MPa)
Cast iron, grade 20	379
Cast iron, grade 30	482
Cast iron, grade 40	551
Tin Bronze, AGMA 2C (11% Sn)	207
Aluminium Bronze (ASTM 148 – 52) (Alloy 9C – H.T.)	448



**Fig. 9.5 Life factor  $K_L$**

## SPUR GEAR – ENDURANCE LIMIT

**Table 9.16 Reliability factor  $K_R$**

Reliability (%)	$K_R$
50	1.25
99	1.00
99.9	0.80

## SPUR GEAR – ALLOWABLE SURFACE FATIGUE STRESS (AGMA)

We know that,

$$[\sigma_H] = \sigma_{Sf} / f_s = 954/1.2 = 795 \text{MPa}$$

For factor of safety  $f_s = 1.2$

Design equation is,  $\sigma_H \leq [\sigma_H]$

$$26.051 \sqrt{F_t} = 795 \rightarrow F_t = 931 \text{ N}$$

Maximum Power that can be transmitted is,

$$W = F_t V/1000 = 931 \times 4.051/1000 = 3.51 \text{kW}$$