Formulario

Propiededades mecanicas	Dislocaciones y endurecimiento
$\sigma = \frac{F_t}{A_0} \square \tau = \frac{F_s}{A_o} \square \sigma_R = \frac{F}{A_i}$	Fuerza de traccion: $F_n = F\cos(\varphi)$
$\varepsilon = \frac{\Delta L}{L_0} = \frac{L - L_0}{L_0}$	Fuerza cizalladura: $F_c = \cos(\lambda)$
$\varepsilon_L = \frac{\Delta \varnothing}{\varnothing_0} = \frac{\varnothing - \varnothing_0}{\varnothing_0}$	$A_\varphi = \frac{A}{\cos(\varphi)}$
$\gamma = \tan(\theta) \square \tau = G\gamma$	$\sigma_n = \sigma\cos(\varphi)^2$
$\upsilon = -\frac{\varepsilon_L}{\varepsilon}\ \epsilon\ [-1, 0.5]$	$\tau_r = \sigma\cos(\varphi)\cos(\lambda)$
$P = -K\frac{\Delta V}{V_0}$	$\sigma_y = \frac{\tau_{CRSS}}{(\cos(\varphi)\cos(\lambda))_{MAX}}$
$U_R = \int_0^{\varepsilon_y} \sigma d\varepsilon = 0.5\varepsilon_y\sigma_y = $ $= \frac{\sigma_y^2}{2E} = 0.5E\varepsilon_y^2$	mejor caso: $\varphi = \lambda = 45^o \Rightarrow \sigma_y = 2\tau_{CRSS}$
$\%EL = \frac{L_f - L_0}{L_0} \times 100$	$\sigma_y = \sigma_0 + k_y d^{-1/2}$
$\%AR = \frac{A_0 - A_f}{A_0} \times 100$	$\%CW = \frac{A_o - A_d}{A_o} \times 100$
$U_t = \int_0^{\varepsilon_f} \sigma d\varepsilon = U_r + \int_{\varepsilon_y}^{\varepsilon_f} \sigma d\varepsilon$	$d^n - d_0^n = Kt$

- σo límite elástico del material en estado monocristalino (cte)
- ky parámetro de ajuste (cte)
- d diámetro medio de los granos (variable)

Fracture	Fatigue	Diffusion	Creep
$K_c = $ $Y\sigma_c\sqrt{\pi a}$	$\sigma_m = \frac{\sigma_{max} + \sigma_{min}}{2}$	$N_v = $ $N_0\exp(-\frac{Q}{kT})$	$\dot{\varepsilon}_s = K_1\sigma^n$
$K_{Ic} = Y\sigma\sqrt{\pi a}$	$\sigma_r = \sigma_{max} - \sigma_{min}$	$J = \frac{1}{A}\frac{dM}{dt}$	$\dot{\varepsilon}_s = $ $K_2\sigma^n\exp(-\frac{Q_c}{RT})$
A3	$\sigma_a = \frac{\sigma_{max} - \sigma_{min}}{2} = $ $\frac{\sigma_r}{2}$	$J = -D\frac{dC}{dx}$	
A3	$R = \frac{\sigma_{min}}{\sigma_{max}}$	$\frac{\delta C}{\delta t} = D\frac{\delta^2 C}{\delta x^2}$	

Fracture	Fatigue	Diffusion	Creep
A3	$\Delta\sigma \cdot N_f^a = C_1$	$\frac{C_x - C_0}{C_s - C_0} = 1 - erf(\frac{x}{2\sqrt{Dt}})$	
A3	$\sum \frac{n_i}{NN_i} = 1$	$\frac{C_x - C_0}{C_s - C_0} = 1 - erf(z)$	

Failure	Temperature T	Load/Stress σ
Fracture	Low	static
Fatige	Low	cyclic time-dependent
Creep	High($T > 0.4T_m$)	static