

OPTI-502 Equation Sheet

$$\text{OPL} = n l$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\gamma = 2\alpha$$

$$d = t \left(\frac{n-1}{n} \right) = t - \tau$$

$$\phi = (n' - n)C$$

$$\frac{n'}{z'} = \frac{n}{z} + \phi$$

$$f_E = \frac{1}{\phi} = -\frac{f_F}{n} = \frac{f'_R}{n'}$$

$$m = \frac{z'/n'}{z/n} = \frac{\omega}{\omega'}$$

$$m = \frac{f_{F2}}{f'_{R1}} = -\frac{f_2}{f_1}$$

$$\bar{m} = \frac{n'}{n} m^2$$

$$\frac{\Delta z'/n'}{\Delta z/n} = m_1 m_2$$

$$m_N = \frac{n}{n'}$$

$$P'N' = PN = f_F + f'_R$$

$$\tau = \frac{t}{n} \quad \omega = n u$$

$$\phi = \phi_1 + \phi_2 - \phi_1 \phi_2 \tau$$

$$\delta' = \frac{d'}{n'} = -\frac{\phi_1}{\phi} \tau \quad \text{BFD} = d' + f'_R$$

$$\delta = \frac{d}{n} = \frac{\phi_2}{\phi} \tau \quad \text{FFD} = d + f_F$$

$$\omega' = \omega - y\phi$$

$$y' = y + \omega' \tau'$$

$$f/\# \equiv \frac{f_E}{D_{EP}} \quad \text{NA} \equiv n |\sin U| \approx n |u|$$

$$f/\#_w \equiv \frac{1}{2\text{NA}} \approx \frac{1}{2n|u|} \approx (1-m) f/\#$$

$$I = H = n \bar{u} y - n u \bar{y}$$

$$\bar{u} = \tan(\theta_{1/2})$$

$$\text{MP} = \frac{10\text{in}}{f} = \frac{250\text{mm}}{f}$$

$$\text{MP} = \frac{1}{m}$$

$$m_V = m_{\text{OBJ}} \text{MP}_{\text{EYE}}$$

$$L = \frac{M}{\pi} = \frac{\rho E}{\pi}$$

$$\Phi = LA\Omega \quad \Omega \approx \frac{A}{d^2}$$

$$E' = \frac{\pi L_O}{4(f/\#_w)^2}$$

$$\text{Exposure} = E \Delta T$$

$$a \geq |y| + |\bar{y}| \quad \text{Un}$$

$$a = |\bar{y}| \quad \text{and} \quad a \geq |y| \quad \text{Half}$$

$$a \leq |\bar{y}| - |y| \quad \text{and} \quad a \geq |y| \quad \text{Full}$$

$$\text{DOF} = \pm B' f / \#_w$$

$$L_H = -\frac{fD}{B'} \quad L_{\text{NEAR}} = \frac{L_H}{2}$$

$$D = 2.44\lambda f / \#$$

$$D \approx f / \# \quad \text{in } \mu\text{m}$$

$$\text{Sag} \approx \frac{y^2}{2R}$$

$$v = \frac{n_d - 1}{n_F - n_C}$$

$$P = \frac{n_d - n_C}{n_F - n_C}$$

$$\delta = -(n-1)\alpha$$

$$\frac{\delta}{\Delta} = v \quad \frac{\varepsilon}{\Delta} = P$$

$$\frac{\alpha_1}{\delta} = -\left(\frac{1}{v_1 - v_2}\right)\left(\frac{v_1}{n_{d1} - 1}\right)$$

$$\frac{\alpha_2}{\delta} = \left(\frac{1}{v_1 - v_2}\right)\left(\frac{v_2}{n_{d2} - 1}\right)$$

$$\frac{\varepsilon}{\delta} = \left(\frac{P_1 - P_2}{v_1 - v_2}\right)$$

$$n = \frac{\sin[(\alpha - \delta_{\text{MIN}})/2]}{\sin(\alpha/2)}$$

$$\theta_C = \sin^{-1}\left(\frac{n_S}{n_R}\right)$$

$$\frac{\delta\phi}{\phi} = \frac{\delta f}{f} = \frac{1}{v}$$

$$\text{TA}_{\text{CH}} = \frac{r_P}{v}$$

$$\frac{\phi_1}{\phi} = \frac{v_1}{v_1 - v_2} \quad \frac{\phi_2}{\phi} = -\frac{v_2}{v_1 - v_2}$$

$$\frac{\delta\phi_{\text{dC}}}{\phi} = \frac{\delta f_{\text{Cd}}}{f} = \frac{\Delta P}{\Delta v}$$