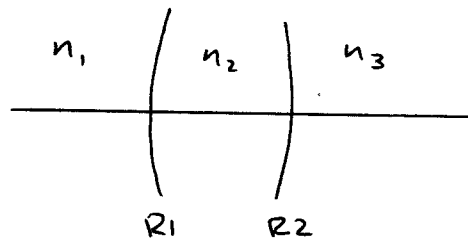


# Thick Lens - Varying Index

$$R_1 = 127 \text{ mm}$$

$$R_2 = -77 \text{ mm}$$

$$TH = 17 \text{ mm}$$



$$\phi_1 = \frac{n_2 - n_1}{R_1}$$

$$\phi_2 = \frac{n_3 - n_2}{R_2}$$

a)  $n_1 = 1.0$

$$n_2 = 1.472$$

$$n_3 = 1.0$$

$$\phi_1 = .00372/\text{mm}$$

$$\phi_2 = .00613/\text{mm}$$

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

$$\phi = .00958/\text{mm}$$

$$f = 104 \text{ mm}$$

$$\delta' = -\frac{\phi_1}{\phi} \tau$$

$$\delta' = -4.48 \text{ mm}$$

$$d' = -4.48 \text{ mm}$$

$$\text{BFD} = f_{R'} + d'$$

$$f_{R'} = 104 \text{ mm}$$

$$\text{BFD} = 99.5 \text{ mm}$$

b)  $n_1 = 1.0$

$$n_2 = 1.853$$

$$n_3 = 1.0$$

$$\phi_1 = .00672/\text{mm}$$

$$\phi_2 = .01108/\text{mm}$$

$$\phi = .01711/\text{mm}$$

$$f = 58.4 \text{ mm}$$

$$d' = n_3 \delta'$$

$$\delta' = -3.60 \text{ mm}$$

$$d' = -3.60 \text{ mm}$$

$$f_{R'} = n_3 f$$

$$f_{R'} = 58.4 \text{ mm}$$

$$\text{BFD} = 54.8 \text{ mm}$$

c)  $n_1 = 1.333$

$$n_2 = 1.472$$

$$n_3 = 1.333$$

$$\phi_1 = .00109/\text{mm}$$

$$\phi_2 = .00181/\text{mm}$$

$$\tau = TH/n_2$$

$$\phi = .00288/\text{mm}$$

$$f = 348 \text{ mm}$$

$$\delta' = -4.37$$

$$d' = -5.83$$

$$f_{R'} = 463 \text{ mm}$$

$$\text{BFD} = 457 \text{ mm}$$