From the drawing, all field lines that enter the netting exit through the circular end.

The net flux (pardon the pun) through the closed surface is 0. As there is no enclosed charge,

\[ \Phi_{\text{circular end}} = \int \mathbf{E} \cdot d\mathbf{A} = \pi a^2 E \]

\[ \Phi_{\text{net}} = -\pi a^2 E \quad \text{(Note sign!)} \]

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Ch 24 p13  Sphere - diameter 1.2 m \( \Rightarrow \) \( r = 0.6 \) m

\( \sigma = 8.1 \mu C/m^2 = 8.1 \times 10^{-6} C/m^2 \)

a) \[ \Phi = (\sigma \cdot A) = \sigma (4\pi r^2) = \left( 8.1 \times 10^{-6} \frac{C}{m^2} \right) (4\pi)(0.6 \text{ m})^2 \]

\[ = 3.66 \times 10^{-5} \text{ C} \]

b) \[ \Phi_{\text{tot}} = \frac{q_{\text{enc}}}{\varepsilon_0} = \frac{3.66 \times 10^{-5} \text{ C}}{8.85 \times 10^{-12} \text{ C}^2/Nm^2} = 4.14 \times 10^6 \frac{\text{Nm}^2}{\text{C}} \]