

17. The magnitude of the electric field produced by a uniformly charged infinite line is $E = \lambda/2\pi\epsilon_0 r$, where λ is the linear charge density and r is the distance from the line to the point where the field is measured. See Eq. 24-12. Thus,

$$\lambda = 2\pi\epsilon_0 E r = 2\pi(8.85 \times 10^{-12} \text{ C}^2/\text{N} \cdot \text{m}^2)(4.5 \times 10^4 \text{ N/C})(2.0 \text{ m}) = 5.0 \times 10^{-6} \text{ C/m} .$$