

4.35 This problem asks that we determine the ASTM grain size number if 30 grains per square inch are measured at a magnification of 250. In order to solve this problem we make use of Equation 4.17:

$$N_M \left( \frac{M}{100} \right)^2 = 2^{n-1}$$

where  $N_M$  = the number of grains per square inch at magnification  $M$ , and  $n$  is the ASTM grain size number. Solving the above equation for  $n$ , and realizing that  $N_M = 30$ , while  $M = 250$ , we have

$$\begin{aligned} n &= \frac{\log N_M + 2 \log \left( \frac{M}{100} \right)}{\log 2} + 1 \\ &= \frac{\log 30 + 2 \log \left( \frac{250}{100} \right)}{\log 2} + 1 = 2.5 \end{aligned}$$