

Economic Order Quantity

A company purchases a part which is a component of one of the assemblies it manufactures. This component is used at a uniform rate, totaling 25,000 units per year. The company has ascertained the following costs: \$14.00 to place and receive each order, and an inventory carrying cost equal to 20% of the unit purchase price. No minimum amount of inventory is required.

The units are available at the following prices:

- a) \$1.00 each for lot sizes of 1 to 1,999 units
- b) \$0.50 each for lot sizes of 2,000 to 4,999
- c) \$0.30 each for lot sizes of 5000 or more

Determine the economic order quantity (Q) for each price:

$$a. \quad Q = \sqrt{\frac{2NS}{I}} = Q = \sqrt{\frac{2(25,000)(14)}{0.2}} = 1871$$

$$b. \quad Q = \sqrt{\frac{2NS}{I}} = Q = \sqrt{\frac{2(25,000)(14)}{(0.2) \times (0.5)}} = 2646$$

$$c. \quad Q = \sqrt{\frac{2NS}{I}} = Q = \sqrt{\frac{2(25,000)(14)}{(0.2) \times (0.3)}} = 3416 \rightarrow 5000$$

Determine the total annual costs for the inventory for each economic order quantity, including the purchase price + ordering costs + carrying costs:

$$\text{Order Cost} = \frac{N}{Q} S ; \text{Holding Cost} = \frac{Q}{2} I$$

a. $(25,000 \times 1) + \left(\frac{25,000}{1871} \times 14\right) + \left(\frac{1871}{2} \times 0.2\right) = \$25,374.2$

b. $(25,000 \times 0.5) + \left(\frac{25,000}{2646} \times 14\right) + \left(\frac{2646}{2} \times (0.2 \times 0.5)\right) = \$12,764.5$

c. $(25,000 \times 0.3) + \left(\frac{25,000}{5000} \times 14\right) + \left(\frac{5000}{2} \times (0.2 \times 0.3)\right) = \$7,720$