

CHAPTER 9

PROCESS COSTING

AGENDA

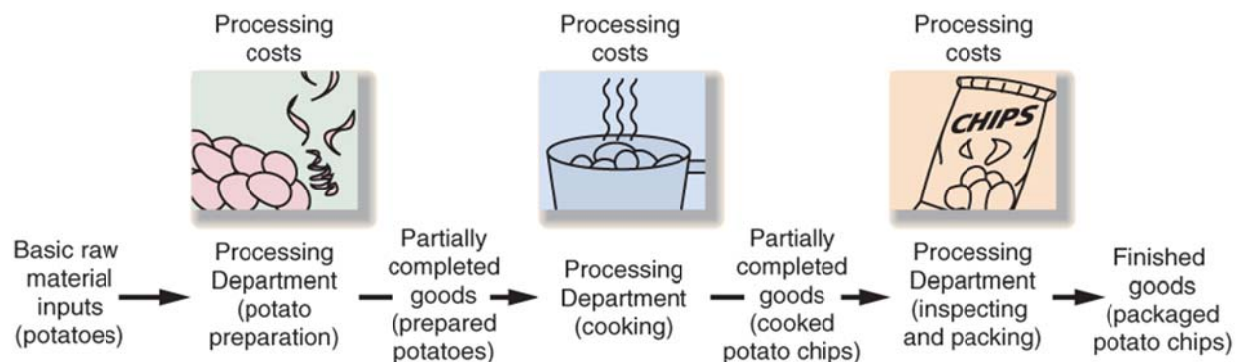
- I. Process Costing and differences between job-order and process costing
- II. Overview of process costing
- III. The concept of equivalent (whole) units for partially completed units
- IV. The weighted-average method for determining costs
- V. The FIFO method for determining costs.
- VI. Comparison of weighted-average and FIFO methods.

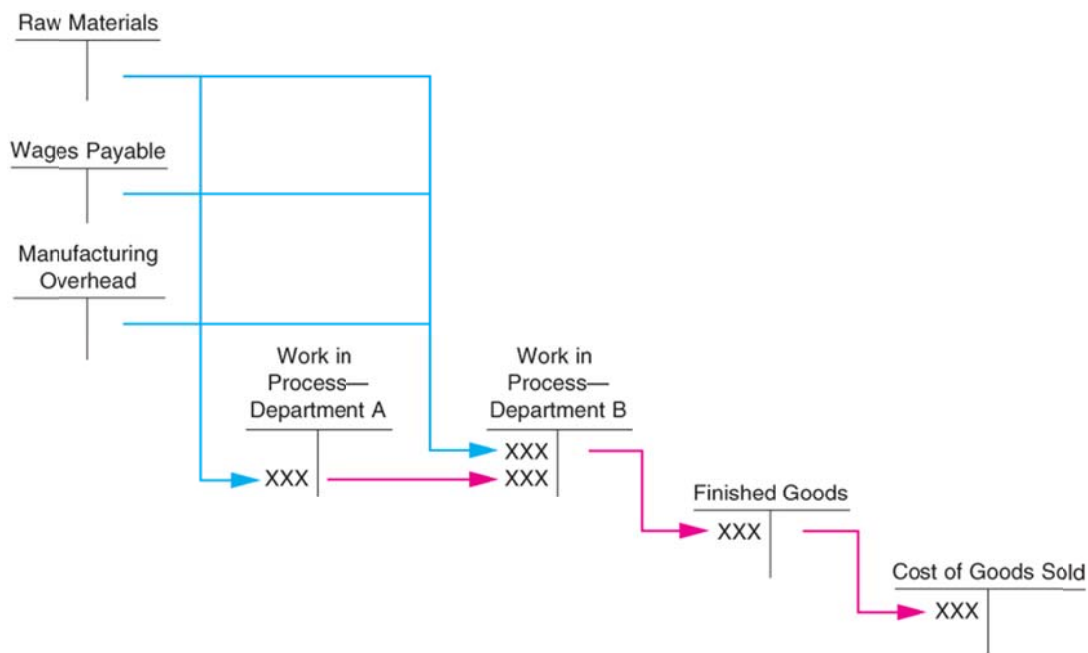
I. DIFFERENCES BETWEEN JOB-ORDER AND PROCESS COSTING

Job-Order Costing	Process Costing
1. Many different jobs are worked on during each period, with each job having different production requirements.	1. A single product is produced either on a continuous basis or for long periods of time. All units of product are identical.
2. Costs are accumulated by individual job.	2. Costs are accumulated by department.
3. Unit costs are computed <i>by job</i> on the job cost sheet.	3. Unit costs are computed <i>by department</i> .

II. OVERVIEW OF PROCESS COSTING

- A. In process costing, costs are accumulated in processing departments.
- B. A separate departmental production report is compiled for each processing department. This report provides the details of how costs are assigned to units that pass through the department.





- C. Costs to be accounted for in each processing department consist of:
1. Costs of the beginning work in process inventory in the department.
 2. Costs added during the period.
 - a. Costs of units transferred in from a preceding department.
 - b. Costs added in the department itself.

$$\text{Materials} + \boxed{\text{Overhead}}$$

↑
Conversion Costs

- D. Costs are accounted for by assigning them to:
1. Ending work in process inventory in the department.
 2. Units transferred out to the next department (or to finished goods).

III. THE CONCEPT OF EQUIVALENT (WHOLE) UNITS FOR PARTIALLY COMPLETED UNITS

In process costing, each unit is assigned the average cost of units processed through the department.

Two things must be known to compute the average cost per unit in a department:

1. The total cost.
2. The total number of units processed.

Partially completed units are converted to equivalent (whole) units (EUs).

For example, 200 units in ending inventory are 25% complete with respect to conversion costs.

$$\begin{aligned} \text{Equivalent units} &= \text{Number of partially completed units} \times \text{Percentage completion} \\ &= 200 \times 25\% = 50 \text{ EUs} \end{aligned}$$

The two common methods of computing average costs per unit are the weighted-average method and the FIFO method.

IV. WEIGHTED-AVERAGE METHOD

- The weighted-average method averages together the beginning work in process inventories with the units started during the current period.
- For each category of cost in each processing department the following calculations are made:

$$\begin{array}{ccccc} \text{Equivalent} & & \text{Units} & & \text{Equivalent units} \\ \text{units of} & = & \text{transferred} & + & \text{in ending WIP} \\ \text{production} & & \text{out} & & \text{inventory} \end{array}$$

Units transferred out of the department
are 100% complete with respect to
the work done in the department.

$$\text{Cost per equivalent unit} = \frac{\text{Cost of beginning work in process inventory} + \text{Cost added during the period}}{\text{Equivalent units of production}}$$

$$\text{Cost of units transferred out} = \text{Cost per equivalent unit} \times \text{Units transferred out}$$

EXAMPLE: Halsey Company makes small sailboats. During the most recent month, the following activity was recorded in the Hull Fabrication Department for conversion costs.

Work in process, beginning (80% complete)	15,000 units
Units started into production	180,000 units
Units transferred to the next department	175,000 units
Work in process, ending (30% complete)	20,000 units

Conversion Costs:

Work in process, beginning	\$24,000
Conversion costs incurred during the month	\$338,000

Computation of equivalent units of production:

Units transferred to the next department	175,000 EUs
Work in process, ending	— EUs
Equivalent units of production	— EUs

Computation of cost per equivalent unit:

Cost of beginning work in process inventory	\$ 24,000	
Costs added during the period	<u>338,000</u>	
Total cost (a)	<u>\$362,000</u>	
Equivalent units of production (b)		EUs
Cost per equivalent unit (a) ÷ (b)		per EU

Computation of cost of units in ending work in process inventory:

Equivalent units of production of units in ending work in process inventory	6,000 EUs	
Cost per equivalent unit (see above) (b)	\$2 per EU	
Cost of units in ending work in process inventory (a) × (b).....	\$12,000	

Computation of cost of units transferred out:

Units transferred to the next department (a).....	175,000 EUs	
Cost per equivalent unit (see above) (b)	\$2 per EU	
Cost of units transferred out (a) × (b)	\$350,000	

The above computations would be repeated for each classification of costs incurred in the production of the sailboats.

The Cost Reconciliation Report:

Costs to be accounted for:

Cost of beginning work in process inventory	\$24,000
Costs added to production during the period.....	<u>338,000</u>
Total costs to be accounted for	<u>\$362,000</u>

Costs accounted for as follows:

Cost of ending work in process inventory	\$12,000
Cost of units transferred out	<u>350,000</u>
Total cost accounted for	<u>\$362,000</u>

V. FIFO METHOD

- The FIFO method separates the costs of beginning inventory from the costs incurred during the current period. (The weighted-average method combines them.)
- FIFO assumes the beginning inventory is completed before any new units are started.

$$\begin{array}{l} \text{Equivalent} \\ \text{units of} \\ \text{production} \end{array} = \begin{array}{l} \text{Equivalent units} \\ \text{to complete beginning} \\ \text{WIP inventory} \end{array} + \begin{array}{l} \text{Units started} \\ \text{and completed} \\ \text{during the period} \end{array} + \begin{array}{l} \text{Equivalent units} \\ \text{in ending} \\ \text{WIP inventory} \end{array}$$



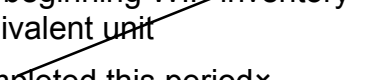
 Units in beginning inventory ×
 (100% – Percentage completion of beginning WIP inventory)

$$\text{Cost per equivalent unit} = \frac{\text{Cost added during the period}}{\text{Equivalent units of production}}$$

$$\begin{array}{l} \text{Cost of units} \\ \text{transferred} \\ \text{out} \end{array} = \begin{array}{l} \text{Cost in} \\ \text{beginning WIP} \\ \text{inventory} \end{array} + \begin{array}{l} \text{Cost to complete} \\ \text{units in beginning} \\ \text{WIP inventory} \end{array} + \begin{array}{l} \text{Cost of units started} \\ \text{and completed} \\ \text{this period} \end{array}$$



 Equivalent units to complete beginning WIP inventory ×
 Cost per equivalent unit



 Units started and completed this period ×
 Cost per equivalent unit

$$\begin{array}{l} \text{Cost of units in} \\ \text{ending WIP inventory} \end{array} = \begin{array}{l} \text{Cost per} \\ \text{equivalent unit} \end{array} \times \begin{array}{l} \text{Equivalent units in} \\ \text{ending WIP inventory} \end{array}$$

EXAMPLE: Halsey Company makes small sailboats. During the most recent month, the following activity was recorded in the Hull Fabrication Department for conversion costs.

Work in process, beginning (80% complete)	15,000 units
Units started into production	180,000 units
Units transferred to the next department	175,000 units
Work in process, ending (30% complete)	20,000 units

Conversion Costs:

Work in process, beginning	\$24,000
Conversion costs incurred during the month	\$338,000

- Computation of equivalent units of production:

To complete beginning work in process inventory (15,000 units × 20% complete)	3,000 EUs
Units started and completed during the period (180,000 units started – 20,000 units in ending inventory)	160,000 EUs
Work in process, ending (20,000 units × 30% complete)	<u>6,000 EUs</u>
Equivalent units of production	<u>169,000 EUs</u>

- Computation of cost per equivalent unit:

Costs added during the period (a)	\$338,000
Equivalent units of production (b)	169,000 EUs
Cost per equivalent unit (a) ÷ (b)	\$2 per EU

FIFO METHOD (continued)

Computation of cost of units in ending work in process inventory:

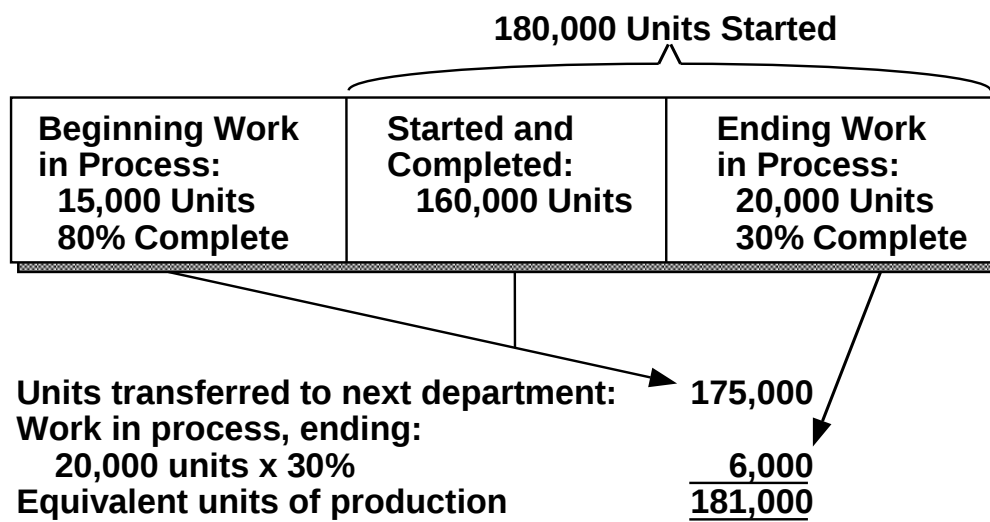
Equivalent units of production of units in ending work in process inventory (see above).....	6,000 EUs
Cost per equivalent unit (see above) (b)	\$2 per EU
Cost of units in ending work in process inventory (a) × (b)	\$12,000

Computation of cost of units transferred out:

<i>Cost in beginning work in process inventory</i>	\$24,000
<i>Cost to complete the units in beginning work in process inventory:</i>	
Equivalent units of production required to complete the units in beginning work in process inventory (see above) (a)	3,000 EUs
Cost per equivalent unit (see above) (b)	\$2 per EU
Cost to complete the units in beginning inventory (a) × (b)	\$6,000
<i>Cost of units started and completed this period:</i>	
Units started and completed this period (see above) (a)	160,000 EUs
Cost per equivalent unit (see above) (b)	\$2 per EU
Cost of units started and completed this period (a) × (b)	\$320,000
 Total cost of units transferred out (\$24,000 + \$6,000 + \$320,000)	 \$350,000

Note: The costs of ending inventory and of the units transferred to the next department are the same in this example under the weighted-average and FIFO methods. Therefore, the FIFO method cost reconciliation would look the same as the cost reconciliation shown for the weighted-average method. This will not be true in most cases.

VI. COMPARISON OF EQUIVALENT UNITS

Weighted-Average Method**FIFO Method**