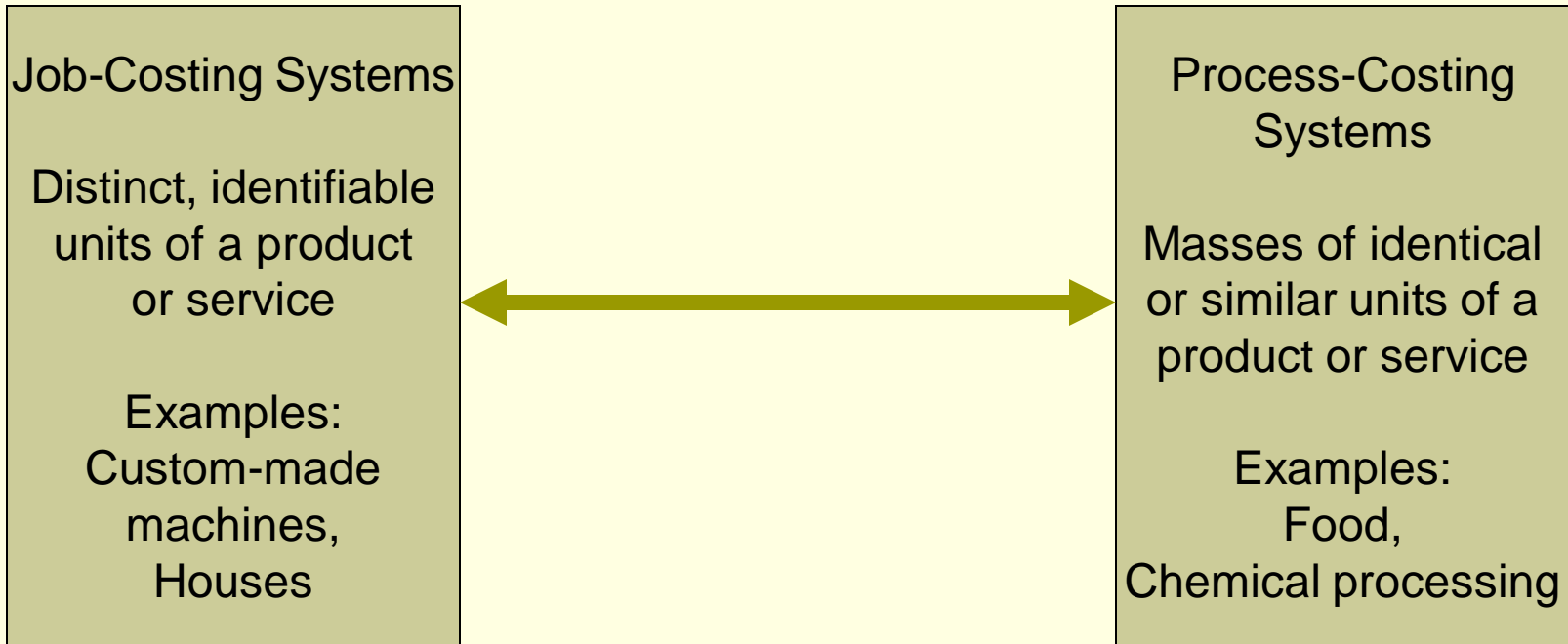


# CHAPTER 17

## Process Costing

# Job-Costing and Process Costing:

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# Process Costing

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- Process costing is a system where the unit cost of a product or service is obtained by assigning total costs to many identical or similar units
- Each unit receives the same or similar amounts of direct materials costs, direct labor costs, and manufacturing overhead
- Unit costs are computed by dividing total costs incurred by the number of units of output from the production process

# Process-Costing Assumptions

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- Direct Materials are added at the beginning of the production process, or at the start of work in a subsequent department down the assembly line
- Conversion Costs are added equally along the production process

# Five-Step Process-Costing Allocation

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1. Summarize the flow of physical units of output
2. Compute output in terms of equivalent units
3. Compute cost per equivalent unit
4. Summarize total costs to account for
5. Assign total costs to units completed and to units in ending Work in Process

# Equivalent Units

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- A derived amount of output units that:
  1. Takes the quantity of each input in units completed and in unfinished units of work in process and
  2. converts the quantity of input into the amount of completed output units that could be produced with that quantity of input
- Are calculated separately for each input (direct materials and conversion cost)

# Weighted-Average Process-Costing Method

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- Calculates cost per equivalent unit of all work done to date (regardless of the accounting period in which it was done)
- Assigns this cost to equivalent units completed and transferred out of the process, and to incomplete units still in process

# Weighted-Average Process-Costing Method

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- Weighted-average cost is the total of all costs in the Work-in-Process account divided by the total equivalent units of work done to date
- The beginning balance of the Work-in-Process account (work done in a prior period) is *blended in* with current period costs



# Steps 1 - 5

Weighted-Average Method

# Step 1: Summarize Output

## Step 2: Compute Equivalent Units

Flow of Production	STEP 1	STEP 2	
	Physical Units	Equivalent Units	
		Direct Materials	Conversion Costs
Beginning Work in Process	25		
Units Started during the current period	75		
Total Units to Account For	<u>100</u>		
Units Completed and Transferred Out During the Current Period: 100%	90	90	90
Ending Work in Process	10		
Ending WIP is: 100% complete as to materials		10	
10% complete as to conversion costs			1
Units Accounted For	<u>100</u>		
Work Done in Current Period Only		<u>100</u>	<u>91</u>

# Step 3: Compute Cost per Unit

# Step 4: Summarize Total Costs

	<b>STEP 4</b>	<b>STEP 3</b>	
	Total Product Costs	Direct Materials	Conversion Costs
Beginning Work in Process	\$ 4,000	\$ 1,000	\$ 3,000
Current Period Costs Added	14,000	4,000	10,000
Total Costs to Account For	<u>\$ 18,000</u>	<u>5,000</u>	<u>13,000</u>
Divide by Equivalent Units from Step 2		100	91
Cost per Equivalent Unit		<u>\$ 50.00</u>	<u>\$ 142.86</u>

# Step 5: Assign Costs to Units Completed and Ending Work in Process

Cost Assignment:			
Multiply Equivalent Units from Step 2 by Cost per Unit from Step 3	Direct Materials	Conversion Costs	Total Costs
Units Completed and Transferred Out			
Direct Materials: 90 X \$50.00	\$ 4,500		
Conversion Costs: 90 X \$142.86		\$ 12,857	\$ 17,357
Ending Work in Process			
Direct Materials: 10 X \$50.00	500		
Conversion Costs: 1 X \$142.86		143	643
Total Cost Accounted For			\$ 18,000
(Ties to Step 4, rounded to nearest \$)			

# Result of the Process (as before)

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- Two critical figures arise out of Step Five of the cost allocation process:
  1. The amount of the allocated cost of units completed and sent from Work-in-Process Inventory to Finished Goods Inventory
  2. The ending balance of the Work-in-Process Inventory account that will appear on the Balance Sheet

# Transferred-in Costs

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- Are costs incurred in previous departments that are carried forward as the product's cost when it moves to a subsequent process in the production cycle
- Also called Previous Department Costs
- Transferred-in costs are treated as if they are a separate type of direct material added at the beginning of the process

**17-16 (25 min.) Equivalent units, zero beginning inventory.**

Candid, Inc., is a manufacturer of digital cameras. It has two departments: assembly and testing. In January 2014, the company incurred \$800,000 on direct materials and \$805,000 on conversion costs, for a total manufacturing cost of \$1,605,000.

**Required:**

(1) Assume there was no beginning inventory of any kind on January 1, 2014. During January, 5,000 cameras were placed into production and all 5,000 were fully completed at the end of the month. What is the unit cost of an assembled camera in January?

(2) Assume that during February 5,000 cameras are placed into production. Further assume the same total assembly costs for January are also incurred in February, but only 4,000 cameras are fully completed at the end of the month. All direct materials have been added to the remaining 1,000 cameras. However, on average, these remaining 1,000 cameras are only 60% complete as to conversion costs. (a) What are the equivalent units for direct materials and conversion costs and their respective costs per equivalent unit for February? (b) What is the unit cost of an assembled camera in February 2014?



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- Direct materials cost per unit
  - (\$800,000 ÷ 5,000)           \$ 160.00
  - Conversion cost per unit
  - (\$805,000 ÷ 5,000)           161.00
  - Assembly Department cost  
per unit   \$321.00

Summarize the Flow of Physical Units and Compute Output  
in Equivalent Units;  
**Assembly Department of Candid, Inc., for February 2014.**

Flow of Production	(Step 1) Physical Units	(Step 2) Equivalent Units	
		Direct Materials	Conversion Costs
Work in process, beginning (given)	0		
Started during current period (given)	<u>5,000</u>		
To account for	<u>5,000</u>		
Completed and transferred out during current period	4,000	4,000	4,000
Work in process, ending* (given) 1,000 × 100%; 1,000 × 60%	<u>1,000</u>	1,000	600
Accounted for	<u>5,000</u>		
Equivalent units of work done in current period		<u>5,000</u>	<u>4,600</u>

\*Degree of completion in this department: direct materials, 100%; conversion costs, 60%.

# Compute the Cost per Equivalent Unit, Assembly Department of Candid, Inc., for February 2014.

	<b>Total Production Costs</b>	<b>Direct Materials</b>	<b>Conversion Costs</b>
<b>(Step 3)</b> Costs added during February	\$1,605,000	\$800,000	\$805,000
Divide by equivalent units of work done in current period (Solution Exhibit 17- 16A)		<u>÷ 5,000</u>	<u>÷ 4,600</u>
Cost per equivalent unit		<u>\$ 160</u>	<u>\$ 175</u>

- **17-21/22 FIFO method, equivalent units.**
- The assembly division of Fenton Watches, Inc., uses the FIFO method of process costing. Consider the following data for the month of May 2014:

	Physical Units (Watches)	Direct Materials	Conversion Costs
Beginning work in process (May 1) <sup>a</sup>	80	\$ 493,360	\$ 91,040
Started in May 2014	500		
Completed during May 2014	460		
Ending work in process (May 31) <sup>b</sup>	120		
Total costs added during May 2014		\$3,220,000	\$1,392,000

- <sup>a</sup>Degree of completion: direct materials, 90%; conversion costs, 40%.
- <sup>b</sup>Degree of completion: direct materials, 60%; conversion costs, 30%.
- **Required:**
- 1. Compute equivalent units for direct materials and conversion costs. Show physical units in the first column of your schedule.
- 2. assign costs to units completed (and transferred out) and to units in ending work in process.

Flow of Production	(Step 1) Physical Units	(Step 2) Equivalent Units	
		Direct Materials	Conversion Costs
Work in process, beginning (given)	80	(work done before current period)	
Started during current period (given)	<u>500</u>		
To account for	<u>580</u>		
Completed and transferred out during current period:			
From beginning work in process <sup>§</sup>	80		
$80 \times (100\% - 90\%); 80 \times (100\% - 40\%)$		8	48
Started and completed	380 <sup>†</sup>		
$380 \times 100\%, 380 \times 100\%$		380	380
Work in process, ending* (given)	120		
$120 \times 60\%; 120 \times 30\%$		72	36
Accounted for	<u>580</u>		
Equivalent units of work done in current period		<u>460</u>	<u>464</u>

	<b>Total Production Costs</b>	<b>Direct Materials</b>	<b>Conversion Costs</b>
<b>(Step 3)</b> Work in process, beginning (given)	\$ 584,400	\$ 493,360	\$ 91,040
Costs added in current period (given)	<u>4,612,000</u>	<u>3,220,000</u>	<u>1,392,000</u>
Total costs to account for	<u><u>\$5,196,400</u></u>	<u><u>\$3,713,360</u></u>	<u><u>\$1,483,040</u></u>
<b>(Step 4)</b> Costs added in current period		\$3,220,000	\$1,392,000
Divide by equivalent units of work done in current period (Solution Exhibit 17-21)		<u>÷ 460</u>	<u>÷ 464</u>
Cost per equiv. unit of work done in current period		<u><u>\$ 7,000</u></u>	<u><u>\$ 3,000</u></u>
<b>(Step 5)</b> Assignment of costs:			
Completed and transferred out (460 units):			
Work in process, beginning (80 units)	\$ 584,400	\$493,360	+ \$91,040
Costs added to beginning work in process in current period	<u>200,000</u>	(8* × \$7,000)	+ (48* × \$3,000)
Total from beginning inventory	784,400		
Started and completed (380 units)	<u>3,800,000</u>	(380† × \$7,000)	+ (380† × \$3,000)
Total costs of units completed and transferred out	4,584,400		
Work in process, ending (120 units)	<u>612,000</u>	<u>(72# × \$7,000)</u>	+ <u>(36# × \$3,000)</u>
Total costs accounted for	<u><u>\$5,196,400</u></u>	<u><u>\$3,713,360</u></u>	+ <u><u>\$1,483,040</u></u>