

Chapter Four

Accounting for Manufacturing Business

Nature of manufacturing business:

A manufacturing business purchase raw materials, converts them into finished goods and sells them to customers (wholesalers, retailers, end users). Examples include sugar factories, wood work companies, cement factories, textile factories, paper and pulp processing firms, food complex factories. In manufacturing firms the activities involved and the investment required are usually complex and extended than the other types of business organizations.

Sound cost accounting system is critically important in a manufacturing business to compute cost of finished goods manufactured during the period. Correct cost computation is important for both internal decision making such as departmental evaluation and product pricing as well as external reporting purposes.

Inventory accounts in manufacturing organizations

Transforming materials into finished products ready for sale requires a number of production and production related activities. A manufacturing organization's accounting system tracks these activities as product costs flowing through the Materials Inventory, Work in Process Inventory, and Finished Goods Inventory accounts.

- The **Materials Inventory** account shows the balance of the cost of unused materials.
- The **Work in Process Inventory** account shows the manufacturing costs that have been incurred and assigned to partially completed units of product.
- The **Finished Goods Inventory** account shows the costs assigned to all completed products that have not been sold.

Manufacturing Costs

The cost of a manufactured product includes the cost of materials used in making the product, as well as the costs incurred in converting the materials into a finished product. For example, Legend Guitars uses employees, machines, and other inputs to convert wood and other materials into the finished product, guitars. The finished guitar is the cost object, and the cost of the finished guitars includes direct materials cost, direct labor cost, and factory overhead cost.



Direct Materials Cost: Manufactured products convert raw materials into finished products. For example, Legend Guitars uses raw materials such as wood, guitar strings, and guitar bridges and converts them into a finished guitar. The cost of any material that is an integral part of the final guitar is classified as a **direct materials cost**. Other examples of direct materials costs are the cost of electronic components for a TV manufacturer, lumber for a furniture manufacturer, silicon wafers for a producer of microcomputer chips, and tires for an automobile manufacturer.

As a practical matter, a direct materials cost must not only be an integral part of the finished product, but it must also be a significant portion of the total cost of the product. For Legend Guitars, the cost of wood used in the body and neck is a significant portion of the total cost of each guitar.

Direct Labor Cost: Most manufacturing processes need employees to convert materials into the final product. For example, Legend Guitars uses employees to assemble guitars by gluing together the neck and body and installing the guitar bridge and strings. The wages of each employee who is directly involved in converting materials into the final guitar are classified as a direct labor cost. Other examples of direct labor costs are carpenters' wages for a construction contractor, mechanics' wages in an automotive repair shop, machine operators' wages in a tool manufacturing plant, and assemblers' wages in a computer assembly plant.

A direct labor cost must not only be an integral part of the finished product, but it must also be a significant portion of the total cost of the product. For Legend Guitars, the wages of employees who operate the saws and cutting machines and assemble the guitars make up a significant portion of the total cost of each guitar.

Factory Overhead Cost Costs, other than direct materials cost and direct labor cost, that are incurred in the manufacturing process are combined and classified as **factory overhead cost**. Factory overhead is sometimes called **manufacturing overhead** or **factory burden**. All factory overhead costs are indirect costs and include the costs of:

- Heating and lighting the factory,
- Repairing and maintaining factory equipment,
- Property taxes,

- Insurance, and
- Depreciation on factory plant and equipment.

Factory overhead cost also includes materials and labor costs that do not enter directly into the finished product. Examples include the cost of oil used to lubricate machinery and the wages of janitorial and supervisory employees. If the costs of direct materials or direct labor are not a significant portion of the total product cost, these costs may be classified as factory overhead.

In Legend Guitars, the costs of sandpaper, buffing compound, and glue used in the assembly of guitars enter directly into the manufacture of each guitar. However, because these costs are a small cost of each guitar, they are classified as factory overhead. Other overhead costs for Legend Guitars would include the power to run the machines, the depreciation of machines, and the salary of production supervisors (including the vice president of production).

Product Costs and Period Costs: For financial reporting purposes, costs are often classified as either product costs or period costs. **Product costs** consist of the three elements of manufacturing cost: direct materials, direct labor, and factory overhead. Period costs are generally classified into two categories: selling and administrative. Selling expenses are incurred in marketing the product and delivering the sold product to customers. Administrative expenses are incurred in the administration of the business and are not directly related to the manufacturing or selling functions.

Product costing system

Cost accounting systems accumulate manufacturing costs for the goods that are produced. This product cost information is used by managers to establish product prices, control operations, and develop financial statements. In addition, the cost accounting system improves control by supplying data on the costs incurred by each manufacturing department or process.

There are two principal types of product costing systems: job order costing and process costing systems.

- a. **Job costing:** provides a separate record for the cost of each quantity of product that passes through the factory. A particular quantity of product is termed a job. A job order cost system is best suited to industries that manufacture custom goods to fill special orders from customers or that produce a wide variety of products for stock. Manufacturers that use a job order cost system are sometimes called job shops. The total cost of a job is the sum of direct materials, direct labor, and factory overhead costs recorded in the job cost sheet for that particular job (N.B a job may be a single unit or a number of units with the same nature. For instance 12 beds ordered by a single hotel may be considered as one job by a wood work company).
- b. **Process costing system:** Under a process cost system, costs are accumulated for each of the departments or processes within the factory. A process system is best suited for manufacturers of units of product that are

not distinguishable from each other during a continuous production process. Examples would be oil refineries, paper producers, chemical processors, aluminum smelters, and food processors. This system is applicable where similar items are produced in bulk in almost equal attention.

Manufacturing Business Transactions and Journal Entries

The manufacturing business has a number of unique transactions not found in a merchandising business. These transactions as a whole all fall into the manufacturing costs category.

Basically, there are three types of manufacturing transactions:

1. Material
2. Factory labor
3. Manufacturing overhead

The most common of these three types of transactions are the following:

1. Purchase of raw materials
2. Freight on material purchased
3. Material returns and allowances
4. Incurrence of direct factory labor
5. Incurrence of manufacturing overhead

Journal Entries for Basic Manufacturing Transactions				
	Transaction	Journal Entry	Debit	Credit
1	10,000 units of material X were purchase for 12 per unit	Material purchases Accounts payable	120,000	120,000
2	Invoice on freight received for material X,\$2,000	Freight-in - materials Accounts payable	2,000	2,000
3	Damaged material X returned, \$5,000	Accounts payable Material returns	5,000	5,000
4	Factory workers/incurred paid: Direct factory workers \$200,000 Indirect factory labor \$50,000	Factory labor - Direct Mfg. overhead Indirect labor Payroll payable/cash	200,000 50,000	250,000
5	Other Manufacturing overhead for the month was as follows: Factory utilities \$5,000	Manufacturing overhead Accounts payable Factory utilities \$5,000	13,000	13,000

	Factory repairs and maintenance \$3,000 Factory insurance \$4,000 Factory supplies \$1,000	Repairs and main. \$3,000 Factory insurance \$4,000 Factory supplies \$1,000		
6	Depreciation on plant & equipment, \$2,000	Mfg. overhead -plant deprec. Allowance for depreciation/Accumulated depreciation	2,000	2,000

Financial statements of manufacturing companies

Balance Sheets: Merchandising and Manufacturing Compared

The balance sheet of a manufacturing business in terms of basic elements is identical to the balance sheet of a merchandising business. The only difference is in one area, the current asset section. Instead of one inventory account, the manufacturing business has three inventory accounts:

Merchandising Business		Manufacturing Business	
1. Assets		1. Assets	
Current assets		Current assets	
Cash	\$	Cash	\$
50,000		50,000	
Accounts receivable	30,000	Accounts receivable	
Merchandise inventory	65,000	30,000	
Fixed assets	\$	Inventory	
55,000		Work in process	
		25,000	
		Materials	
		10,000	
2. Liabilities		Finished goods	
Current liabilities	\$	30,000	
20,000		Fixed assets	
Long-term liabilities			

30,000		55,000	
3. Stockholders' Equity			
Paid-in capital	30,000	<u>\$200,000</u>	
Retained earnings	<u>120,000</u>	2. Liabilities	
		Current liabilities	\$
<u>\$200,000</u>		20,000	
		Long-term liabilities	
		30,000	
		1. Stockholders' Equity	
		Paid-in capital	
		30,000	
		Retained earnings	
		120,000	
		<u>\$200,000</u>	

Income Statement for a Manufacturing Company

The major difference in the income statements for merchandising and manufacturing businesses is in the reporting of cost of products sold during the period. A merchandising business purchases merchandise (products) in a finished state for resale to customers. The cost of products sold is called the cost of merchandise sold, which we described and illustrated in earlier chapters. A manufacturer makes the products it sells, using direct materials, direct labor, and factory overhead. The cost of the product sold is generally called the cost of goods sold. For a manufacturer, the total cost of making and finishing the product is called the cost of goods manufactured. This is very similar to the cost of merchandise available for sale in a merchandising business.

The income statement of manufacturing companies is supported by a statement of cost of goods manufactured, which provides the details of the cost of goods manufactured.

To illustrate the flow of manufacturing costs to the income statement for Legend Guitars, assume the following data for 2008:

Inventories	January 1
December 31	
Materials	\$65,000
\$35,000	
Work in process	30,000
24,000	
Finished goods	60,000
62,500	

Materials purchased during the year \$100,000

Direct labor incurred in production 110,000

Factory overhead incurred in production:

Indirect labor	\$24,000
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Depreciation on factory equipment	10,000
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Factory supplies and utility costs	<u>10,000</u>
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Total	<u>44,000</u>
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Selling expenses	20,000
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Administrative expenses	15,000
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Sales	366,000
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The cost of goods manufactured is determined by first computing the cost of direct materials used in the year as follows:

Materials inventory, January 1, 2008	\$ 65,000
Add: Materials purchased during the year	100,000
Cost of materials available for use	\$165,000
Less: Materials inventory, December 31, 2008	35,000
Cost of direct materials used in production	\$130,000

The total manufacturing costs incurred during the year of \$284,000 is determined as follows:

Direct materials used during the year	\$130,000
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Direct labor	110,000
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Factory overhead	44,000
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Total manufacturing costs incurred during the year	\$284,000
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To determine the cost of goods manufactured during the year, the beginning work in process inventory of \$30,000 is added to the total manufacturing costs incurred during the year of \$284,000 to yield the total manufacturing costs of \$314,000. The ending work in process of \$24,000 is then deducted to determine the cost of goods manufactured during the year as follows:

Work in process inventory, January 1, 2008	\$ 30,000
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Total manufacturing costs incurred during the year	284,000
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Total manufacturing costs	\$314,000
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Less work in process inventory, December 31, 2008	24,000
Cost of goods manufactured during the year	\$290,000

Legend Guitars
Income Statement
For the Year Ended December 31, 2008

Sales	
.....\$366,000	
Cost of goods sold:	
Finished goods inventory, January 1, 2008	.60,000
Cost of goods manufactured	<u>.290,000</u>
Cost of finished goods available for sale	350,000
Less finished goods inventory, December 31, 2008	<u>.62500</u>
Cost of goods sold	
.....\$287000	
Gross profit	
.....78500	
Operating expenses:	
Selling expenses	
20,000	
Administrative expenses	<u>.15000</u>
Total operating expenses	
.....35000	
Net income	
.....\$43000	

Legend Guitars
Statement of Cost of Goods Manufactured
For the Year Ended December 31, 2008

Work in process inventory, January 1, 2008	
.....\$30,000	
Direct materials:	
Materials inventory, January 1, 2008	\$ 65,000
Purchases	100,000

Cost of materials available for use.....	\$165,000
Less materials inventory, December 31, 2008	<u>35,000</u>
Cost of direct materials used in production	
\$130,000	
Direct labor	
110,000	
Factory overhead:	
Indirect labor	\$ 24,000
Depreciation on factory equipment	10,000
Factory supplies and utility costs	<u>10,000</u>
Total factory overhead	
<u>44,000</u>	
Total manufacturing costs incurred during the	
year.....	<u>284,000</u>
Total manufacturing costs	
.....	\$314,000
Less work in process inventory, December 31, 2008	
<u>24,000</u>	
Cost of goods manufactured.....	
<u>\$290,000</u>	

Adjusting and closing entries for a manufacturing business

End-of-period adjusting and closing entries must be made to record:

1. Transfer of materials inventory balance to cost of goods manufactured
2. Transfer of beginning material purchases to cost of goods manufactured
3. Transfer of materials freight-in to cost of goods manufactured
4. Transfer of manufacturing overhead incurred to cost of goods manufactured
5. Recording of ending balance of material inventory
6. Transfer of cost of goods manufactured account to cost of goods sold account
7. Transfer of finished goods account balance to cost of goods sold account
8. Recording of ending finished goods inventory

Example : the trial balance of Mahrew Shoe factory at December 31. 2002 shows the following account balance before adjusting entries are journalized and posted.

Mahrew shoe factory Trial Balance December 31,2002		
Account title	Debit	Credit
Cash	14400	
Raw materials inventory	8000	
Work in process inventory	2500	
Finished goods inventory	11200	
Prepaid factory insurance	4550	
Factory supplies	6700	
Office supplies	1750	
Machinery	75000	
Accum. Depreciation machinery		28125
Accounts payable		4420
Mahrew, capital		56605
Sales		170,550
Raw material purchases	45100	
Freight on RM purchases	1000	
Direct labor	19000	
Indirect labor	8400	
Factory utilities	2100	
Delivery expenses	9000	
Office salaries expense	27200	
Sales salaries expense	13200	
Advertising expense	9000	
Miscellaneous expense	1600	
Total	259,700	259,700

The necessary data for making adjustments and updating ledger accounts are as follows

- a. Raw materials inventory at December 31,2002 was Br2,500
- b. Work in process inventory at December31,2002 was Br3100
- c. Finished goods inventory at December 31, 2002 was Br2000
- d. Unexpired portion of prepaid factory insurance at December 31,2002 was Br50
- e. Factory supplies on hand at December 31, 2002 was Br700
- f. Office supplies on hand at December 31, 2002 was Br50
- g. Accrued direct and indirect labor were Br500 and Br100 respectively at December 31,2002
- h. Machinery was being depreciated for the last 15 years on straight line basis.

Required:

1. Prepare the statements of cost of goods manufactured
2. Pass the adjusting entries

Adjusting entries

Date	Description	Debit	Credit
Dec 31,2002	Manufacturing summary Raw material inventory jan1,2002 Work in process inventory jan.1,2002 (To eliminate beginning balances)	10500	8000 2500
Dec 31,2002	Raw material inventory,dec.31 Work in process inventory,Dec.31 Manufacturing summary (Updating the manufacturing inventory accounts)	2500 3100	5600
Dec 31,2002	<i>Income summary</i> <i>Finished good inventory, jan1</i> (to eliminate the beginning balance of fin.goods inventory)	11200	11200
Dec 31,2002	Finished goods inventory,Dec31 Income summary (to update the finished goods inventory account)	2000	2000
Dec 31,2002	Factory insurance costs Prepaid factory insurance (To record the insurance costs expired)	4500	4500
Dec 31,2002	Factory supplies cost Factory supplies	6000	6000
Dec 31,2002	Direct labor Indirect labor Accrued wags payable	500 100	600
Dec 31,2002	Factory depreciation costs Accumulated depreciation	1875	1875

Dec 31,2002	Office supplies expense Office supplies	1700	1700

II. Closing entries

a. Close manufacturing cost accounts

Manufacturing summary.....	88575
Raw materials purchases.....	45100
Freight on raw material purchased.....	1000
Direct labor.....	19500
Indirect labor.....	8500
Factory utilities.....	2100
Factory insurance.....	4500
Factory supplies.....	6000
Factory depreciation costs.....	1875

b. Closing revenue accounts

Sales	170,550
Income summary.....	170,550

c. Closing expenses

Income summary.....	155175
Office salaries expense.....	27200
Sales salaries expense.....	13200
Delivery expense.....	9000
Advertising expense.....	9000
Office supplies expense.....	1700
Miscellaneous expense.....	1600
Manufacturing summary.....	93475

d. Closing the income summary account

Income summary.....	6175
Mahrew capital.....	6175