

CHAPTER –IV

PROCESS COSTING

Introduction

Process Costing is a method of costing used to find out the cost of a product at each stage or process of production. There are certain industries where the raw material passes through different stages of production, before it becomes a finished product. In such cases, it is desirable to find out the cost of the product at the end of each stage or process. This purpose is served by process costing. It is employed in chemical works, soap making, oil refining, textiles, paper, food products, iron and steel etc.,

FEATURES OF PROCESS COSTING

1. Production is continuous. The final product is the result of a sequence of processes.
2. The units manufactured are standardized and identical.
3. The output of the one process is the input of the next process. The output of the last process is transferred to finished stock.
4. Cost of material, wages and overheads are collected for process and debited to the process account.
5. The cost per unit is arrived at by dividing the total process cost by the number of units produced.
6. The total cost of the finished product is the sum of all costs incurred in all the processes.

MERITS OF PROCESS COSTING

1. The cost of each process and the finished product can be computed periodically, say, at the end of each month.
2. Expenses can be allocated to the process on a suitable basis. The cost of each process can be ascertained accurately.
3. Budgeted and actual figures are available for each process. Process costing also highlights abnormal loss if any. Hence, managerial control is comparatively easier.
4. The method of process costing is simple and involves less clerical work.
5. Process costing facilitates correct valuation of stock and work in progress.
6. The average cost of identical products can be computed easily.

LIMITATIONS OF PROCESS COSTING

1. The average cost computed in process costing conceals the weaknesses and inefficiencies in processing.
2. Where production is not homogeneous, the average cost may present an incorrect picture of actual costs.
3. In the valuation of work in progress, estimation is required to determine the stage of completion. The estimation weakens the accuracy of cost figures.

4. If joint products come out of the same process, the problem of apportionment of joint costs among different products arises. If apportionment is not properly done, cost results may not be accurate.
5. Process costing is based on historical costs. Hence, it has all the weaknesses of historical costing.

PROCESS LOSS

In all manufacturing industries material loss occurs in the process of production. This is evident from the difference between the quantity of input and output. This loss is broadly divided into Two:

- Normal Loss
- Abnormal Loss

NORMAL LOSS

Normal loss refers to the loss, which is unavoidable in the manufacturing process. It is inherent in the process of production. It arises under normal conditions due to the nature of material or production

CAUSES

The causes of normal loss are evaporation, chemical reaction, shrinkage, spoilage etc.

ACCOUNTING TREATMENT

In process accounts, normal loss is recorded only in terms of quantity. The cost of unit lost is absorbed by the good units produced in each process. Any realizable value of normal loss units is credited to the process account.

ABNORMAL LOSS

Abnormal loss refers to the loss, which is avoidable. It arises due to abnormal or unusual factors. The cost of abnormal loss is not included in the cost of process.

CAUSES

The causes of abnormal loss are sub standard material, bad design, accidents, carelessness etc.

ACCOUNTING TREATMENT

The value of abnormal loss is calculated as follows:

$$\text{Abnormal loss} = \frac{\text{Normal cost of normal output} \times \text{Units of abnormal loss}}{\text{Normal output}}$$

The amount of abnormal loss is debited to abnormal loss account and credited to process account. Any realizable value of abnormal units is credited to abnormal loss account. The balance in abnormal loss account is transferred to costing profit and loss account.

ABNORMAL GAIN ACCOUNT

In process costing, normal loss is estimated based on experience. When the actual loss is less than the estimated loss, it gives to abnormal gain. In other words, if the actual output is higher than the normal output it is called as abnormal gain.

ACCOUNTING TREATMENT

Abnormal gain is calculated as follows:

$$\text{Abnormal gain} = \frac{\text{Normal cost of normal output}}{\text{Normal output}} \times \text{Units of abnormal gain}$$

The amount of abnormal gain is debited to process account and credited to the abnormal gain account. Because of abnormal gain, scrap realization shown against the normal loss is reduced. The loss in income because of reduced scrap realization is debited to abnormal gain account and credited to normal loss account. The balance is transferred to costing profit and loss account.

Specimen of Process Account when there are normal loss and abnormal losses.

Dr.		Process I A/c.		Cr.	
Particulars	Units	Rs.	Particulars	Units	Rs.
To Basic Material	xxx	xx	By Normal Loss	xx	xx
To Direct Material		xx	By Abnormal Loss	xx	xx
To Direct Wages		xx	By Process II A/c.	xx	xx
To Direct Expenses		xx	(output transferred to		
To Production Overheads		xx	Next process)		
			By Process I Stock A/c.	xx	xx
To Abnormal Gains		<u>xx</u>			
Total	<u>xxx</u>	<u>xxx</u>	Total	<u>xx</u>	<u>xx</u>

DIFFERENCE BETWEEN JOB COSTING AND PROCESS COSTING

1. Nature of Production

In case of job costing, production is carried on against the specific orders from customers. However, in case of process costing, production is carried on in anticipation of demand.

2. Cost of Job and Process

In case of job costing, costs are accumulated for each job, but in case of process, costs are accumulated for each process for a period.

3. Cost Computation

Costs are computed on completion of the job in case of job costing whereas; costs are computed periodically for each process in case of process costing.

4. Work in Progress

In case of job costing, each job may or may not have opening or closing work in progress. In case of process, production is continuous. Hence, there is opening and closing work in progress.

5. Transfer of Cost

Costs are not transferred except when there is a surplus production in case of job costing. Costs are transferred from one process to another in case of process costing.

6. Control

As each job is different from the other, control is difficult in case of job costing. As production is standardized and carried on a mass scale, control is relatively easy in case of process costing.

7. Nature of work

As each job is separately accounted, paper work is more in case of job costing and paper work is comparatively less in case of process costing.

8. Shape and Size

In case of job costing, there is no standardization between the jobs, because each job is not similar to other job. In case of process costing, products are standardized, uniform and have the similar size.

9. Management Control

In job costing, managerial control is not easy. In process, costing, managerial control is easy. The reason is the production is continuous and standardized system.

10. Dependent and independent

In job costing, each job is separately accounted, as one job does not depend on another. In process costing, one process depends upon other process, so the cost cannot be calculated separately.

Illustration 1

A particular brand of phenyl passed through three important processes. During the week ended 15th January, 1952, 600 gross of bottles are produced. The cost book show the following information:

	Process 1	Process 2	Process 3
	Rs.	Rs.	Rs.
Material	4000	2000	1500
Labour	3000	2500	2300
Direct Expenses	600	200	500
Cost of bottles	Nil	2030	Nil
Cost of corks	Nil	Nil	Nil

The indirect expenses for the period were Rs. 1600. The bye-products were sold for Rs. 240 (Process 2). The residue sold for Rs. 125.50 (Process 3).

Prepare the account in respect of each process showing its cost and cost of production of the finished product per gross of bottles.

Solution:

Process 1 (Output 600 gross of bottles)			
	Rs.		Rs.
To Materials	4000.00	By Transfer to Process No. 2 (cost per gross of bottles Rs. 13.69	8215.38

		approximately)	
To Labour	3000.00		
To Direct Expenses	600.00		
To Indirect Expenses	615.38		
Total	8215.38	Total	8215.38
Process 2			
To Transfer from Process 1	8215.38	By Sale of Bye-Product	240.00
To Materials	2000.00	By Transfer to Process of bottles (cost per gross of bottles Rs. 25.36 approximately)	15218.20
To Labour	2500.00		
To Direct Expenses	200.00		
To Indirect Expenses	512.82		
	2030.00		
Total	15458.20	Total	15458.20
Process 3			
To Transfer from Process 2	15458.20	By Sale of residue	125.50
To Materials	1500.00	Bu Finished products account (Cost per gross of bottles Rs. 33.65)	20189.50
To Labour	2300.00		
To Direct Expenses	500.00		
To Indirect Expenses	471.80		
To Cost of rocks	325.00		
Total	20315.00	Total	20315.00

Note: Indirect Expenses have been charged to three processes in the labour ratio of 30 : 25 : 23

Illustration 2

(Normal wastage – Loss in weight and sale of scrap)

The Bengal Chemical Co. Ltd., produced three chemicals during the months of July 1995 by three consecutive processes. In each process 2 per cent of the total weight put in is lost and 10 percent is scrap which from process (1) and (2) realizes Rs. 100 a ton and from process (3) Rs. 20 a ton.

The product of three processes is dealt with as follows:

	Process I	Process II	Process III
Passed to next process	75%	50%	-

Stock kept for sale	25%	50%	100%
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	Process I		Process II		Process III	
	Rs.	Tons	Rs.	Tons	Rs.	Tons
Raw materials	120000	1000	28000	140	107840	1348
Manufacturing Wages	20500	-	18520	-	15000	-
General Expenses	10300	-	7240	-	3100	-

Prepare Process Cost Account, showing the cost per ton of each product.

Solution: Process I

	Tons	Rs.		Tons	Rs.
To Raw Materials	1,000	1,20,000	By Loss of weight (2% of 1000 tons)	20	-
To Manufacturing Wages		20,500	By Sales of scrap (10% of 1000 tons)	100	10,000
To General Expenses		10,300	By Transfer to Warehouse	220	35,200
			By Transfer to Process II (cost per ton Rs. 160)	660	1,05,60
Total	1,000	1,50,800		1,000	1,50,800

Process II

	Tons	Rs.		Tons	Rs.
To Transfer from Process I	660	1,05,600			
To Raw Materials	140	28,000	By Loss of weight (2% of 800 tons)	16	-
To Manufacturing Wages	-	18,520	By Sales of scrap (10% of 800 tons)	80	8,000
To General Expenses	-	7240	By Transfer to Warehouse	352	75,680
			By Transfer to Process III (cost per ton Rs. 215)	352	75,680
Total	800	1,59,360		800	159360

Process III

	Tons	Rs.		Tons	Rs.
To Transfer from Process II	352	75,680			
To Raw Materials	1,348	1,07,840	By Loss of weight (2% of 1700 tons)	34	-
To Manufacturing Wages	-	15,000	By Sales of scrap (10% of 1700 tons)	170	3,400
To General Expenses	-	3,100	By Transfer to Warehouse	1,496	198220
			By Transfer to Process III (cost per ton Rs. 215)	352	75,680
Total	1700	2,01,620	Total	1700	201620

Illustration 3

(Showing Process A/cs and Abnormal Wastage A/cs)

The Imperial Manufacturing Company's product passes through two distinct processes A and B and then to Finished Stock. It is known from past experience that wastage occurring in the process is as under:

In process A 5% of the units entering the process.

In process B 10% of the units entering the process.

The Scrap Value of the wastage in Process A is Rs. 8 per 100 units and Process B is Rs. 100 units.

The Process figures are:

	Process A	Process B
	Rs.	Rs.
Materials consumed	3000	1500
Wages	3500	2000
Manufacturing expenses	1000	1000

5,000 units were brought into Process A costing Rs. 2500.

The outputs were:

Process A 4,700 Units
 Process B 4,150 Units

Prepare Process Cost Accounts showing the cost of the output. Also show abnormal Wastage Account.

Solution:

Process A Account

	Units	Rs.		Units	Rs
To Units introduced	5,000	2,500	By Normal wastage	250	20
To Material		3,000	By Abnormal wastage	50	105*
To Wages		3,500	By Process B	4,700	9,875
To Mfg. Expense		1,000			
	5,000	10,000		5,000	10,000

* The Value of abnormal wastage in Process A is calculated as follows:

Normal output is $5,000 - 250 = 4,750$ units

Normal cost is $10,000 - 20 = \text{Rs. } 9,980$

Therefore, Normal cost of one unit is $9,980 / 4,750 = \text{Rs. } 2.10$

Therefore, Cost of 50 units of Abnormal wastage is $2.10 \times 50 = \text{Rs. } 105$.

As the Abnormal wastage is sold for Rs. 4, therefore, the amount of loss to be transferred to Profit and Loss Account shall be $105 - 4 = \text{Rs. } 101$.

Abnormal Wastage A/c (Process A)

	Units	Rs.		Units	Rs
To Process A	50	105	By sale of Scrap @ Rs. 8 per 100	50	4
			By P & L A/c Loss transferred		101
	50	105		50	105

Process B Account

	Units	Rs.		Units	Rs
To Process A	4700	9875	By Normal Wastage A/c	470	47
To Materials		1500	By Abnormal wastage A/c	80	*271
To Wage		2000	By Finished Stock A/c	4150	14057
	4,700	17,375		4,700	14,375

* The value of abnormal wastage in Process B is calculated as follows:

The normal cost of 4230 units is Rs. 14328

Therefore, Normal Cost of one unit = $14,328/4,230 = \text{Rs. } 3.39$

Therefore, the Cost of 80 units = $\text{Rs. } 3.39 \times 80 = \text{Rs. } 271$

The abnormal wastage will realize Rs. 8, therefore the loss transferable shall be $\text{Rs. } 271 - 8 = \text{Rs. } 263$.

Abnormal Wastage A/c (Process B)

	Units	Rs.		Units	Rs
To Process B	80	271	By sale of Scrap @ Rs. 10 per 100	80	8
			By P & L A/c Loss transferred		263
	80	271		80	271

Illustration 4

From the following details extracted from the costing records of an oil mill for a year ended 31st March, you are required to prepare the process cost account of

- Groundnut Crushing Process;
- Refining Process; and
- Finishing Process including casking, and determine the cost per tone of each process and the total cost per tone of finished oil.

Purchase of 5,000 tonnes of groundnut – Rs. 48,00,000

	Crushing Plant Rs.	Refining Plant Rs.	Finishing Plant Rs.
Wages	25,000	10,000	15,000
Power	6,000	3,600	2,400
Sundry Materials	1,400	20,000	-
Repairs to Plant & Machinery	2,800	3,350	1,400
Steam	6,000	5,200	4,500
Factory Overheads	13,200	6,600	2,100
Cost o Casks	-	-	59,600

3000 tonnes of crude oil were produced; 2,500 tonnes of oil were produced by the refining process; and 2,480 tonnes of refined oil were finished for delivery.

Groundnut shells sold – Rs. 400; 1,750 tonnes of groundnut residue sold – Rs. 11,000; loss in weight in crushing – 250 tonnes; 450 tonnes of by-products obtained from Refining Process – Rs. 16,750.

Solution:

Groundnut Crushing Process

	Tonnes	Rs.		Tonne	Rs.
Groundnut	5000	4800000	Crude oil (C/o)	3000	4843000
Wages		25000	Groundnut residue	1750	11000
Power		6000	Groundnut shells		400
Sundry materials		1400	Process loss	250	-
Repairs to Plant & Machinery		2800			
Steam		6000			
Factory overheads		13200			
	5000	4854400		5000	4854400

Cost per tone of crude oil = Rs. 1614.33

Refining Process

	Tonnes	Rs.		Tonne	Rs.
Crude oil (b/f)	3000	4843000	Refined oil (c/o)	2500	4875000
Wages		10000	By-products	450	16750
Power		3600	Process loss	50	-
Sundry material		20000			
Repairs to Plant & Machinery		3350			
Steam		5200			
Factory overheads		6600			
	3000	4891750		3000	4891750

Cost per tone of refined oil = Rs. 1950

Finishing Process

	Tonnes	Rs.		Tonne	Rs.
Refined oil (b/f)	2500	4875000	Finished oil	2480	4960000
Wages		15000			
Power		2400	Process loss	20	-
Repairs to Plant & Machinery		1400			
Steam		4500			
Factory overheads		2100			
Cost of casks		59600			
	2500	4960000		2500	4960000

Illustration 5

The product of a company passes through three distinct processes to completion. These processes are known as A,B and C. From past experience it is ascertained that wastage is incurred in each process as under:

Process A	2% of input
Process B	3% of input
Process C	10% of input

The normal process loss occurring in the three processes is regularly sold at the rates of 50 paise (Process A), Re. 1 (Process B) and Rs. 2 (Process C) per unit respectively the output of each process passes immediately to the next process and the finished units are transferred from Process C to finished stock. The following expenses were incurred.

	A	B	C
Materials consumed	40000	20000	15000
Direct labour	42000	42600	35000
Manufacturing expenses	14600	8380	13920
Repairs to Plant & Machinery	2,800	3,350	1,400

20,000 units have been issued to Process A at cost of Rs. 80,000. The output from each process has been as under:

Process A	19,500
Process B	18,800
Process C	16,600

There was not stock of work-in-process in any process.

Prepare the process accounts and abnormal wastage account, assuming that the abnormal wastage collected together for all the three processes was sold in one lump and fetched a price of Rs. 10000.

Solution:

Process A:

1.	Actual wastage	=	20000 – 19500 = 500 units
2.	Normal wastage	=	2% of 20000 = 400 units
3.	Scrap sale value	=	400 x Re. 0.50 = Rs. 200
4.	Abnormal wastage	=	Actual wastage less normal wastage = 100 units
5.	Prorata cost	=	Rs. 176000 / (20,000 – 400) = Rs. 19,600
6.	Cost of abnormal wastage		Rs. 176600/19600 x 100 = Rs. 900 (rounded off)

Process A

	Units	Rs.		Units	Rs.
Units	20000	80000	Transfer to	19500	175500

			Process B		
Material		40000	Normal wastage	400	200
Labour		42000	Abnormal wastage	100	900
Overhead		14600			
	20000	176600		20000	176600

Calculations in respect of Process B and C are made in a similar manner. **Process B**

	Units	Rs.		Units	Rs.
Transfer from Process A	19500	175500	Transfer to Process C	18800	244400
Material		20000	Normal wastage	485	585
Labour		42600	Abnormal wastage	115	1495
Overhead		8380			
	19500	246480		19500	246480

Process C

	Units	Rs.		Units	Rs.
Transfer from Process B	18800	244400	Transfer to Finished stock	16000	288000
Material		15000	Normal wastage	1880	3760
Labour		35000	Abnormal wastage	920	16560
Overhead		13920			
	18800	308320		18800	38320

Abnormal Waste Account

Process A	900	Sale	10000
Process B	1495	Loss (Profit and loss account)	8955
Process C	16560		
<i>Total</i>	18955	<i>Total</i>	18955