



BANGLADESH
COST ACCOUNTING
STANDARDS
BCAS - 8

Process Costing

BCAS 8: Process Costing

8.1 Introduction

Manufacturing concerns devote their resourceful effort to ascertain their product cost using different costing methods which sometimes becomes a dilemma for the cost manager, even entrepreneur. But the nature of business and characteristics of products always play the required role for selecting the costing methods. There are few harmonized costing methods practiced worldwide; among all, the process costing is one of the pioneers in relation to the production process of the products where it is identified as mass production process. A process method is characterized by a large number of homogeneous products passing through a series of processes, where each process is responsible for one or more operations that bring a product one step closer to completion.

8.2 Objectives

The objective of this standard is to select the method and improve the relevance, reliability and comparability with the standard reporting format of the process costing that a manufacturing entity applies in its cost sheet/statement. To accomplish that, this standard establishes principles and requirements for how the entity:

- a) Select the costing system (historical or standard cost);
- b) Select the method of process costing (FIFO or weighted average or standard costing);
- c) Recognize normal & abnormal loss and its treatment in the cost sheet/statement.

8.3 Scope

8.3.1 This standard should be applied to manufacturing entity's cost statement if it fulfills the following conditions:

- a) Products should be homogeneous;
- b) There should exist mass production; and
- c) Products should pass through a series of processes consuming resources at a varying level

8.3.2 The standard is to be followed by all public limited companies where cost audit is made mandatory through Government's gazette notification from time to time.

8.4 Key Features

The key features of this standard are pointed below-

- a) Introducing process costing;
- b) Presenting the first in first out, weighted average and standard costing methods;
- c) Presenting normal and abnormal spoilage with its application;
- d) Identifying variances while applying standard costing system; and
- e) Introducing a complete cost of production (COP) report.

8.5 Definitions

The following terms are used in this standard with the meanings specified -

- 8.5.1 **Process:** A process is a series of activities (operations) that are linked to perform a specific task.
- 8.5.2 **Transferred-in Cost:** When goods are completed in one process, they are transferred with their costs to the subsequent process. A cost transferred from a prior process to a subsequent process is referred to as a transferred-in cost.
- 8.5.3 **Cost of Production Report:** The cost of production report is the document that summarizes the manufacturing activity taking place in a process department for a given period of time.
- 8.5.4 **Equivalent Units:** Equivalent units of output are the complete units that could have been produced given the total amount of productive effort expended for the period under consideration.
- 8.5.5 **Normal Loss:** The loss when it is expected called Normal Loss.
- 8.5.6 **Abnormal Loss:** The loss; when it is un-expected called Abnormal Loss.

8.6 Standards

- 8.6.1 ***A cost of production (COP) report should provide information about the physical units processed in a department and also about the manufacturing costs associated with them.***
- 8.6.2 Thus, a production report should divide into a unit information section and a cost information section. The unit information section has two major subdivisions: units to account for and units accounted for.
- 8.6.3 Similarly, the cost information section should have two major subdivisions: costs to account for and costs accounted for.
- 8.6.4 In summary, a production report shall trace the flow of units through a department, identifies the costs charged to the department, shows the computation of unit costs, and reveals the disposition of the department's costs for the reporting period.
- 8.6.5 There shall be steps unique to prepare the COP report: (i) Analysis of the flow of physical units; (ii) Calculation of equivalent units (iii) Computation of unit cost (iv) Valuation of inventories (goods transferred out and ending work in process) (v) Cost reconciliation.
- 8.6.6 In regards of determining equivalent units of output for transferred-out units; a unit would not be transferred out unless these were complete. Thus, every transferred-out unit is an equivalent unit. Units remaining in ending work-in-process inventory, however, are not complete. All these units need to be converted into one completed unit ratio.
- 8.6.7 The process-costing principle requires that the costs of the period be divided by the output of the period. Thus, theoretically, only current period costs and current period output should be used to compute current period unit costs. The FIFO method attempts to follow this theoretical guideline. Under the FIFO costing method, the equivalent units and manufacturing costs in beginning work in process should be excluded from the

current-period unit cost calculation, Thus, the FIFO method recognizes that the work and costs carried over from the prior period legitimately belong to that period.

- 8.6.8 Excluding prior-period work and costs creates some bookkeeping and computational complexity that can be avoided if certain conditions are satisfied. Specifically, if the costs of production remain very stable from one period to the next, then it may be possible to use the weighted average method.
- 8.6.9 Weighted average method should not track prior-period output and costs separately from current-period output and costs.
- 8.6.10 In case of weighted average process costing method preparer should pick up beginning inventory costs and the accompanying equivalent output and treat them as if they belong to the current period. Prior-period output and manufacturing costs found in beginning work in process are merged with the current period output and manufacturing costs. The merging of beginning inventory output and current-period output is accomplished by the way in which equivalent units are calculated.
- 8.6.11 Under the weighted average method, equivalent units of output are computed by adding units completed to equivalent -units in ending work in process. The equivalent units in beginning work in process are included in the computation. Thus, these units are counted as part of the Current period's equivalent units of output.
- 8.6.12 The weighted average method merges prior-period costs with current-period costs by simply adding the manufacturing costs in beginning work in process to the manufacturing costs incurred during the current period. The total cost is treated as if it were the current period's total manufacturing cost.
- 8.6.13 In process manufacturing, some departments invariably receive partially completed direct material for the subsequent process - materials that are added at the beginning of the subsequent process.
- 8.6.14 The usual approach is to treat transferred-in goods as a separate material category when calculating equivalent units.
- 8.6.15 Thus, this process costing method have three categories of manufacturing inputs: transferred-in materials, direct materials added, and conversion costs.
- 8.6.16 In dealing with transferred-in goods, three important points should be considered. First, the cost of this material is the cost of the goods transferred out computed in the prior department. Second, the units started in the subsequent department correspond to the units transferred out from the prior department, assuming that there is a one-to-one relationship between the output measures of both departments. Third, the units of the transferring department may be measured differently than the units of the receiving department. If this is the case, then the goods transferred in must be converted to the units of measure used by the second department.
- 8.6.17 *The standard prescribes no choice regarding the methods of process costing rather it views first in first out, weighted average and standard costing as alternatives.*
- 8.6.18 *Cost of normal spoilage (or normal rework), which is usually expressed as a percentage of good units made, is deemed to be a part of product cost and thus such cost will be absorbed by good units completed in a period. However, the cost of abnormal spoilage (or abnormal rework) is treated as a periodic efficiency item*

8.8 *and charged to periodic income. That is, the cost of abnormal spoilage (or rework) is not deemed to be a product cost rather it will be closed to periodic income statement.*

8.7 Recording and Reporting

- 8.7.1 In process costing method preparer must calculate the cost of goods transferred out and the cost of ending work in process considering all normal and abnormal loss/spoilage.
- 8.7.2 As an example, if the spoilage is normal (expected), the cost of spoiled units is added to the cost of the good units, in a case, the inspection occurred at the 80 percent point of completion (Appendix 8B). Therefore, none of the spoiled units are from ending work in process (assuming WIP units are only 60 percent complete and have not yet been inspected). Thus, all spoilage cost is assigned to the good units transferred out. Whether ending work in process inventory will share any part of normal spoilage cost depends on the percentage of completion of ending work in process and the percentage where inspection for spoilage is conducted.
- 8.7.3 Notice the difference between the treatment of normal and abnormal spoilage. When spoilage is assumed to be normal, it is not tracked separately but is embedded in the total cost of good units. As a result, no one knows precisely how much spoilage adds to total manufacturing costs and whether or not an effort should be made to reduce it. The treatment of spoilage as abnormal is more in keeping with an emphasis on total quality management where there is no tolerance allowed for waste. At least the product cost of spoiled goods is tracked in a separate account. Of course, a factory engaged in total quality management would not stop at classifying spoilage as abnormal.
- 8.7.4 *If spoiled units can be scrapped at a nominal value, the cost of spoilage should be reduced with the net realizable value of such scrapped units. The notion is to reduce the burden of spoiled units on good units completed.*
- 8.7.5 *In case of applying standard costing, variances should be properly accounted for. It is wise to consider the variances as period cost.*

8.8 Effective Date

This standard will be effective from January 1, 2015 onwards.

Appendix 8A

Application of Process Costing

This appendix presents the application of process costing in real life based on the information as assembled in **Table 1** below. The products pass through two consecutive departments: Mixing and Finishing. Usually raw materials are added at the beginning in mixing department. Conversion costs are added evenly throughout the process. At the end of the process, finished goods are inspected and rejected units are spoiled. Industry standards suggest that a normal level of spoilage for this type of operation is 2% of the good units produced. Units that pass inspection are transferred to the finishing department.

	Mixing Department	Finishing Department
Units:		
Units in process, October 1, 60% complete in mixing and 10% complete in finishing	5,000	8,300
Units transferred in	45,000	
Units started	49,000	-
Units completed and transferred out	45,000	49,600
Units spoiled - First Inspection Point	1,000	300
Units spoiled - Second Inspection Point	-	400
Units in process, October 31, 25% complete in mixing and 80% complete in finishing	8,000	3,000
Costs:		
Work in process, October 1:		
Transferred in Costs	-	TK. 597,600
Direct materials	TK. 125,000	0
Conversion costs	150,000	15,770
Total work in process	TK. <u>275,000</u>	TK. <u>613,370</u>
Current costs:		
Transferred in Costs	-	TK. 3,291,000
Direct materials	TK. 1,225,000	530,000
Conversion costs	2,160,000	1,033,800
Total current costs	TK. <u>3,385,000</u>	TK. <u>4,854,800</u>

Table 1: Process Costing Example Data

In the finishing department, a special ingredient is added to the product at 40% level of completion. Then the products are inspected to check whether the ingredient is properly adjusted with the output. At this point, any rejected units are destroyed and the normal rate of spoilage is 0.5% of good units passing the inspection point. All the units survived at 40% go for the further process. At the end, the products are inspected again and defective units are removed and destroyed. The normal rate of spoilage at this point is 1% of good units made.

General Approach:

To illustrate the calculations under process costing environment, all of the three methods (FIFO, Weighted Average and Standard Costing) are applied here in three sequential steps:

Step 1: Computing physical and equivalent units

Step 2: Computing cost per equivalent unit

Step 3: Assignment of costs to compute cost of output

All of the three steps are applied below under three methods for the two departments.

Process Costing under Weighted Average Method - Mixing Department

Step 1: Physical and Equivalent Units

Flow of Production	Physical Units	Equivalent Units			
		Materials		Conversion	
		Units	%	Units	%
Work in process - beginning	5,000		100%		60%
Started during the period	49,000				
Units to account for	54,000				
Units completed and transferred out	45,000	45,000	100%	45,000	100%
Normal spoilage	900	900	100%	900	100%
Abnormal spoilage	100	100	100%	100	100%
Work in process - ending	8,000	8,000	100%	2,000	25%
Units accounted for	54,000				
Equivalent units		54,000		48,000	

Step 2: Cost per Equivalent Unit

Flow of Cost	Total	Material Costs	Conversion Costs
Work in process - beginning	TK. 275,000	TK. 125,000	TK. 150,000
Costs added during this period	3,385,000	1,225,000	2,160,000
Costs to account for	TK. 3,660,000	TK. 1,350,000	TK. 2,310,000
Equivalent units (from step 1)		54,000	48,000
Cost per equivalent unit		TK. 25	TK. 48.125

Step 3: Assignment of Cost

Outputs	Total (TK.)	Material Costs (TK.)		Conversion Costs (TK.)	
Normal spoilage	65,813	$900 \times 25 =$	22,500	$900 \times 48.125 =$	43,313
Abnormal spoilage	7,312	$100 \times 25 =$	2,500	$100 \times 48.125 =$	4,812
Work in process - ending	296,250	$8000 \times 25 =$	200,000	$2000 \times 48.125 =$	96,250
Finished goods	3,290,625	$45,000 \times 25 =$	1,125,000	$45,000 \times 48.125 =$	2,165,625
Costs accounted for	3,660,000				

Process Costing under Weighted Average Method - Finishing Department

Step 1: Physical and Equivalent Units

Flow of Production	Physical Units	Equivalent Units					
		Transferred in		Material		Conversion	
		Units	%	Units	%	Units	%
Work in process - beginning	8,300						
Started during the period	45,000						
Units to account for	53,300						
Units completed and transferred out	49,600	49,600	100%	49,600	100%	49,600	100%
Normal spoilage - Inspection 1	265	265	100%	0	0%	106	40%
Abnormal spoilage - Inspection 1	36	35	100%	0	0%	14	40%
Normal spoilage - Inspection 2	496	496	100%	496	100%	496	100%
Abnormal spoilage - Inspection 2	-96	-96	100%	-96	100%	-96	100%
Work in process - ending	3,000	3,000	100%	3,000	100%	2,400	80%
Units accounted for	53,300						
Equivalent units		53,300		53,000		52,520	

Step 2: Cost per Equivalent Unit

Flow of Cost	Total	Transferred in Costs	Material Costs	Conversion Costs
Work in process - beginning	TK. 613,370	TK. 597,600	TK. 0	TK. 15,770
Costs added during this period	4,854,800	3,291,000	530,000	1,033,800
Costs to account for	TK. 5,468,170	TK. 3,888,600	TK. 530,000	TK. 1,049,570
Equivalent units (from step 1)		53,300	53,000	52,520
Cost per equivalent unit		TK. 72.96	TK. 10.00	TK. 19.98

Step 3: Assignment of Cost

Flow of Cost	Total	Transferred in Costs @ TK. 72.96	Material Costs @ TK. 10.00	Conversion Costs @ TK. 19.98
Normal spoilage - Inspection 1	21,452.28	19,334.40	2,117.88	
Abnormal spoilage Inspection 1	2,833.32	2,553.6	0	279.72
Normal spoilage - Inspection 2	51,058.24	36,188.16	4,960	9,910.08
Abnormal spoilage Inspection 2	-9,882.24	-7,004.16	-960	-1,918.08
Work in process - ending	296,832	218,880	30,000	47,952
Finished goods	5,105,824	3,618,816	496,000	991,008
Costs accounted for	5,468,117.6			

Note: Any difference in assignment of cost is due to the fraction in cost per equivalent unit.

Process Costing under First in First out Method - Mixing Department

Step 1: Physical and Equivalent Units

Flow of Production	Physical Units	Equivalent Units			
		Materials		Conversion	
		Units	%	Units	%
Work in process - beginning	5,000		100%		60%
Started during the period	49,000				
Units to account for	<u>54,000</u>				
Units completed and transferred out:					
● From work in process beginning	5,000	0	0%	2,000	40%
● Started and completed	40,000	40,000	100%	40,000	100%
Normal spoilage	900	900	100%	900	100%
Abnormal spoilage	100	100	100%	100	100%
Work in process - ending	8,000	8,000	100%	2,000	25%
Units accounted for	<u>54,000</u>				
Equivalent units		<u>49,000</u>		<u>45,000</u>	

Step 2: Cost per Equivalent Unit

Flow of Cost	Total	Material Costs	Conversion Costs
Work in process - beginning	TK. 275,000		
Costs added during this period	3,385,000	TK. 1,225,000	TK. 2,160,000
Costs to account for	<u>TK. 3,660,000</u>		
Equivalent units (from step 1)		49,000	45,000
Cost per equivalent unit		TK. 25	TK. 48

Step 3: Assignment of Cost

Outputs	Total (TK.)	Material Costs (TK.)	Conversion Costs (TK.)
Normal spoilage	65,700	900 × 25 = 22,500	900 × 48 = 43,200
Abnormal spoilage	7,300	100 × 25 = 2,500	100 × 48 = 4,800
Work in process - ending	296,000	8000 × 25 = 200,000	2000 × 48 = 96,000
Finished goods:			
● From work in process			
- beginning			
- Opening costs	275,000		
- Costs added this period	96,000	0	2000 × 48 = 96,000
● Started and completed this period	<u>2,920,000</u>	40,000 × 25 = 1,000,000	40,000 × 48 = 1,920,000
Costs accounted for	<u>3,660,000</u>		

Process Costing under First in First out Method - Finishing Department

Step 1: Physical and Equivalent Units

Flow of Production	Physical Units	Equivalent Units					
		Transferred in		Material		Conversion	
		Units	%	Units	%	Units	%
Work in process - beginning	8,300						
Started during the period	45,000						
Units to account for	53,300						
Units completed and transferred out:							
● From work in process beginning	8,300	0	0%	8,300	100%	7,470	90%
● Started and completed	41,300	41,300	100%	41,300	100%	41,300	100%
Normal spoilage - Inspection 1	265	265	100%	0	0%	106	40%
Abnormal spoilage - Inspection 1	35	35	100%	0	0%	14	40%
Normal spoilage - Inspection 2	496	496	100%	496	100%	496	100%
Abnormal spoilage - Inspection 2	-96	-96	100%	-96	100%	-96	100%
Work in process - ending	3,000	3,000	100%	3,000	100%	2,400	80%
Units accounted for	<u>53,300</u>						
Equivalent units		<u>45,000</u>		<u>53,000</u>		<u>51,690</u>	

Step 2: Cost per Equivalent Unit

Flow of Cost	Total	Transferred in Costs	Material Costs	Conversion Costs
Work in process - beginning	TK. 613,370			
Costs added during this period	4,854,800	TK. 3,291,000	TK. 530,000	TK. 1,033,800
Costs to account for	TK. 5,468,170			
Equivalent units (from step 1)		45,000	53,000	51,690
Cost per equivalent unit		TK. 73.13	TK. 10.00	TK. 20.00

Step 3: Assignment of Cost

Outputs	Total	Transferred in Costs @ TK. 73.13	Material Costs @ TK. 10	Conversion Costs @ TK. 20
Normal spoilage - Inspection 1	21,499	19,379	0	2,120
Abnormal spoilage Inspection 1	2,840	2,560	0	280
Normal spoilage - Inspection 2	51,152	36,272	4,960	9,920
Abnormal spoilage Inspection 2	-9,900	-7,020	-960	-1,920
Work in process - ending	297,390	219,390	30,000	48,000
Finished goods				
● From work in process - beginning	613,370	0		
● Opening costs	232,400	0	83,000	149,400
● Costs added this period	4,259,269	3,020,269	413,000	826,000
Costs accounted for	<u>5,468,020</u>			

Note: Any difference in assignment of cost is due to the fraction in cost per equivalent unit.

Process Costing under Standard Costing Method - Mixing Department

Under standard costing method, cost per equivalent unit is not computed rather the assignment is made on the basis of given standard for each element of cost. For example, let us consider the standard cost for two departments as following:

Cost Element	Mixing Department	Finishing Department
Material Costs	TK. 25	TK. 9
Conversion Costs	TK. 46	TK. 18

Step 1: Physical and Equivalent Units

Flow of Production	Physical Units	Equivalent Units			
		Materials		Conversion	
		Units	%	Units	%
Work in process - beginning	5,000				
Started during the period	49,000				
Units to account for	<u>54,000</u>				
Units completed and transferred out:					
● From work in process beginning	5,000	0	0%	2,000	40%
● Started and completed	40,000	40,000	100%	40,000	100%
Normal spoilage	900	900	100%	900	100%
Abnormal spoilage	100	100	100%	100	100%
Work in process - ending	8,000	8,000	100%	2,000	25%
Units accounted for	<u>54,000</u>				
Equivalent units		<u>49,000</u>		<u>45,000</u>	

Step 2: Cost per Equivalent Unit

Flow of Cost	Total (Tk.)	Material Costs	Conversion Costs
Standard cost per equivalent unit		TK. 25	TK. 46
Equivalent units		49,000	45,000
Standard cost for current period works done	3,295,000	TK. 1,225,000	TK. 2,070,000
Work in process - beginning (5,000 units)	263,000	125,000	138,000
Total cost to account for	<u>3,558,000</u>		

Step 3: Assignment of Cost

Outputs	Total (TK.)	Material Costs (TK.)		Conversion Costs (TK.)	
Normal spoilage	63,900	900 × 25	22,500	900 × 46	41,400
Abnormal spoilage	7,100	100 × 25	2,500	100 × 46	4,600
Work in process - ending	292,000	8000 × 25	200,000	2000 × 46	92,000
Finished goods:					
● From work in process - beginning					
- Opening costs	263,000				
- Costs added this period	92,000		0	2000 × 46	92,000
● Started and completed this period	2,840,000	40,000 × 25	1,000,000	40,000 × 46	1,840,000
Costs accounted for	3,558,000		1,225,000		2,070,000
Summary of Variances:					
Standard Cost			1,225,000		2,070,000
Actual Cost (given)			1,225,000		2,160,000
Favorable (unfavorable) variance			0		90,000

Process Costing under Standard Costing Method - Finishing Department

Step 1: Physical and Equivalent Units

Flow of Production	Physical Units	Equivalent Units					
		Transferred in		Material		Conversion	
		Units	%	Units	%	Units	%
Work in process - beginning	8,300						
Started during the period	45,000						
Units to account for	53,300						
Units completed and transferred out							
From work in process beginning	8,300	0	0%	8,300	100%	7,470	90%
Started and completed	41,300	41,300	100%	41,300	100%	41,300	100%
Normal spoilage - Inspection 1	265	265	100%	0	0%	106	40%
Abnormal spoilage - Inspection 1	35	35	100%	0	0%	14	40%
Normal spoilage - Inspection 2	496	496	100%	496	100%	496	100%
Abnormal spoilage - Inspection 2	-96	-96	100%	-96	100%	-96	100%
Work in process - ending	3,000	3,000	100%	3,000	100%	2400	80%
Units accounted for	53,300						
Equivalent units		45,000		53,000		51,690	

Step 2: Total Cost to Account for (for standard costing, this step is revised slightly)

Flow of Cost	Total	Transferred in Costs	Material Costs	Conversion Costs
Standard cost per equivalent unit	TK. 71	TK. 9	TK. 18	
Equivalent units	45,000	53,000	51,690	
Standard cost for current period works done	4,602,420	TK. 3,195,000	TK. 477,000	TK. 930,420
Work in process - beginning (8,300 units)	604,240	589,300	0	14,940
Total cost to account for	5,206,660			

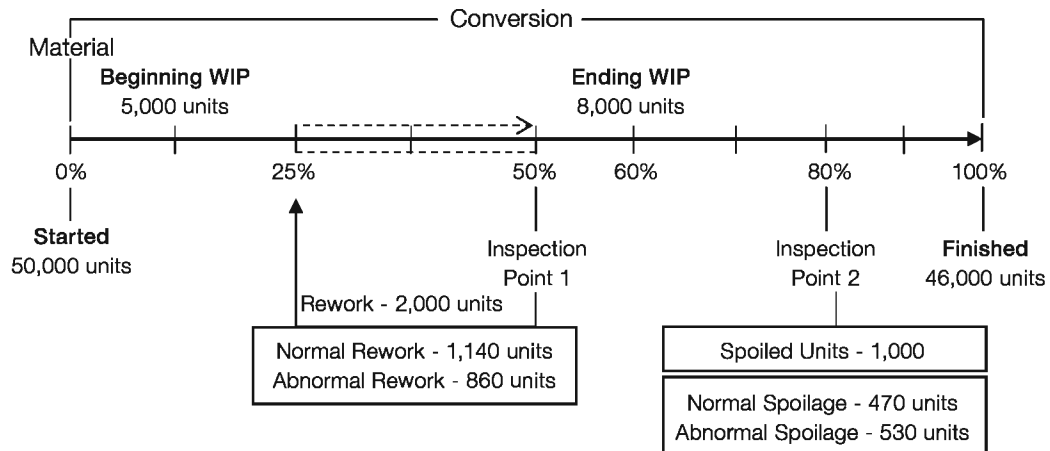
Step 3: Assignment of Cost

Outputs	Total (Tk.)	Transferred in Costs @ TK. 71	Material Costs @ TK. 9	Conversion Costs @ TK. 18
Normal spoilage - Inspection 1	20,723	18,815	0	1,908
Abnormal spoilage Inspection 1	2,737	2,485	0	252
Normal spoilage - Inspection 2	48,608	35,216	4,464	8,928
Abnormal spoilage Inspection 2	-9,408	-6,816	-864	-1,728
Work in process - ending	283,200	213,000	27,000	43,200
Finished goods	0	0	0	0
● From work in process - beginning	0	0	0	0
- Opening costs	604,240			
- Costs added this period	209,160	0	74,700	134,460
● Started and finished this period	4,047,400	2,932,300	371,700	743,400
Costs accounted for	5,206,660	3,195,000	477,000	930,420
Summary of Variances:				
Standard Costs		3,195,000	477,000	930,420
Actual Costs		3,195,000	530,000	1,033,800
Favorable (unfavorable) Variances		0	53,000	103,380

Appendix 8B

Graphical Presentation of a Process Line

This appendix provides a graphical presentation of process costing with normal and abnormal rework and spoilage and their ultimate disposition.



A process starts with 5,000 beginning work in process inventory. Working on an additional 50,000 units started during the period. Raw materials are added at the start of the process whereas conversion costs are added evenly throughout the process. The period completed and transferred a total of 46,000 units into finished goods inventory. However, 8,000 units were remained in ending work in process inventory. The process has two inspection points: one at 50% and another at 80%. Inspection point at 50% is treated as inspection point for rework and at 80% is considered as inspection point for spoilage.

Inspection point at 50%: Any goods rejected at 50% point are sent back to 25% point for rework. 2% of the units inspected at 50% point are considered as normal (expected) rework. During the period, a total of 2,000 units were reworked and the cost of 1,140 units (2% of 57,000) is considered as the cost of normal rework. And the balance (860 units) is considered as abnormal rework. The cost of normal rework should be shifted to all units rightwards proportionately. However, the cost of abnormal rework will be closed to periodic income statement. By this way, cost of normal loss will be borne by the consumer whereas the cost of abnormal rework will be consumed by the manufacturer himself.

Inspection point at 80%: Any goods rejected at 80% point is spoiled and thrown away from the process. 1% of the units inspected at this point are considered normal (1% of 47,000 units) and the balance (530) is considered as abnormal. The cost of normal spoilage should be shifted to all units rightwards (only on finished goods) proportionately and the cost of abnormal spoilage should be closed to periodic income statement with the same logic as it was in case of rework. However, if the spoiled units can be scrapped in that case the cost of spoilage will be reduced by the amount so realized. Such treatment will reduce the burden of the product or the manufacturer to absorb high losses.