Exhibit 18-5 Standard-Costing Method of Process Costing with Spoilage for the Forming Department for July 2014

PANEL A: Summarize the Flow of Physical Units and Compute Output in Equivalent Units

	A	B	C	D	E
1			(Step 1)	(Step 2)	
2				Equivalent Units	
3		Flow of Production	Physical Units	Direct Materials	Conversion Costs
4		Work in process, beginning (given, p. 710)	1,500		
5		Started during current period (given, p. 710)	8,500		
6		To account for	10,000		
7		Good units completed and transferred out during current period:			
8		From beginning work in process[a]	1,500		
9		[1,500 × (100% – 100%); 1,500 × (100% – 60%)]		0	600
10		Started and completed	5,500[b]		
11		(5,500 × 100%; 5,500 × 100%)		5,500	5,500
12		Normal spoilage[c]	700		
13		(700 × 100%; 700 × 100%)		700	700
14		Abnormal spoilage[d]	300		
15		(300 × 100%; 300 × 100%)		300	300
16		Work in process, ending[e] (given, p. 710)	2,000		
17		(2,000 × 100%; 2,000 × 50%)		2,000	1,000
18		Accounted for	10,000		
19		Equivalent units of work done in current period		8,500	8,100
20					
21	[a]Degree of completion in this department: direct materials, 100%; conversion costs, 60%.				
22	[b]7,000 physical units completed and transferred out minus 1,500 physical units completed and transferred out from beginning				
23	work-in-process inventory.				
24	[c]Normal spoilage is 10% of good units transferred out: 10% × 7,000 = 700 units. Degree of completion of normal spoilage in this				
25	department: direct materials, 100%; conversion costs, 100%.				
26	[d]Abnormal spoilage = Actual spoilage – Normal spoilage = 1,000 – 700 = 300 units. Degree of completion of abnormal spoilage in this				
27	department: direct materials, 100%; conversion costs, 100%.				
28	[e]Degree of completion in this department: direct materials, 100%; conversion costs, 50%.				

PANEL B: Summarize the Total Costs to Account For, Compute the Cost per Equivalent Unit, and Assign Costs to the Units Completed, Spoiled Units, and Units in Ending Work-in-Process Inventory

	A	B	C	D	E
30			Total Production Costs	Direct Materials	Conversion Costs
31	(Step 3)	Work in process, beginning (given, p. 724)	$ 22,200	(1,500 × $8.50)	(900 × $10.50)
32		Costs added in current period at standard prices	157,300	(8,500 × $8.50)	(8,100 × $10.50)
33		Total costs to account for	$179,500	$85,000	$94,500
34	(Step 4)	Standard costs per equivalent unit (given, p. 724)	$ 19.00	$ 8.50	$ 10.50
35	(Step 5)	Assignment of costs at standard costs:			
36		Good units completed and transferred out (7,000 units)			
37		Work in process, beginning (1,500 units)	$ 22,200	(1,500 × $8.50) +	(900 × $10.50)
38		Costs added to beginning work in process in current period	6,300	(0^f × $8.50) +	(600^f × $10.50)
39		Total from beginning inventory before normal spoilage	28,500		
40		Started and completed before normal spoilage (5,500 units)	104,500	($5,500^f$ × $8.50) +	($5,500^f$ × $10.50)
41		Normal spoilage (700 units)	13,300	(700^f × $8.50) +	(700^f × $10.50)
42	(A)	Total costs of good units completed and transferred out	146,300		
43	(B)	Abnormal spoilage (300 units)	5,700	(300^f × $8.50) +	(300^f × $10.50)
44	(C)	Work in process, ending (2,000 units)	27,500	($2,000^f$ × $8.50) +	($1,000^f$ × $10.50)
45	(A)+(B)+(C)	Total costs accounted for	$179,500	$85,000 +	$94,500
46					
47	[f]Equivalent units of direct materials and conversion costs calculated in Step 2 in Panel A.				

18-21 Weighted-average method, spoilage. LaCroix Company produces handbags from leather of moderate quality. It distributes the product through outlet stores and department store chains. At LaCroix's facility in northeast Ohio, direct materials (primarily leather hides) are added at the beginning of the process, while conversion costs are added evenly during the process. Given the importance of minimizing product returns, spoiled units are detected upon inspection at the end of the process and are discarded at a net disposal value of zero.

LaCroix uses the weighted-average method of process costing. Summary data for April 2014 are as follows:

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	A	B	C	D
1		Physical Units	Direct Materials	Conversion Costs
2	Work in process, beginning inventory (April 1)	2,400	$21,240	$ 13,332
3	Degree of completion of beginning work in process		100%	50%
4	Started during April	12,000		
5	Good units completed and transferred out during April	10,800		
6	Work in process, ending inventory (April 30)	2,160		
7	Degree of completion of ending work in process		100%	75%
8	Total costs added during April		$97,560	$111,408
9	Normal spoilage as a percentage of good units	10%		
10	Degree of completion of normal spoilage		100%	100%
11	Degree of completion of abnormal spoilage		100%	100%

Required

1. For each cost category, calculate equivalent units. Show physical units in the first column of your schedule.
2. Summarize the total costs to account for; calculate the cost per equivalent unit for each cost category; and assign costs to units completed and transferred out (including normal spoilage), to abnormal spoilage, and to units in ending work in process.

18-22 FIFO method, spoilage.

Required

1. Do Exercise 18-21 using the FIFO method.
2. What are the managerial issues involved in selecting or reviewing the percentage of spoilage considered normal? How would your answer to requirement 1 differ if all spoilage were viewed as normal?

18-23 Spoilage, journal entries. Safeclear, Inc., is the leading manufacturer of automotive glass components such as windshields. The company uses a process-costing system to account for its work-in-process inventories. When Job 26, an order for windshields for the Chevy Malibu, was being processed, a piece of laminated sheet glass was off-center in the cutting machine and two windshields were spoiled. Because this problem occurs periodically, it is considered normal spoilage and is consequently recorded as an overhead cost. Because this step comes first in the process of making the windshields, the only costs incurred were $325 for direct materials. Assume the laminated glass cannot be sold, and its cost has been recorded in work-in-process inventory.

Required

Prepare the journal entries to record the spoilage incurred.

18-24 Recognition of loss from spoilage. Roku Electronics manufactures universal power adapters at its Desert Sands plant. The company provides you with the following information regarding operations for April 2014:

Total power adapters manufactured	10,000
Adapters rejected as spoiled units	375
Total manufacturing cost	$400,000

Assume the spoiled units have no disposal value.

Required

1. What is the unit cost of making the 10,000 universal power adapters?
2. What is the total cost of the 375 spoiled units?
3. If the spoilage is considered normal, what is the increase in the unit cost of good adapters manufactured as a result of the spoilage?
4. If the spoilage is considered abnormal, prepare the journal entries for the spoilage incurred.

18-25 Weighted-average method, spoilage. WaferCo is a fast-growing manufacturer of computer chips. Direct materials are added at the start of the production process. Conversion costs are added evenly during the process. Some units of this product are spoiled as a result of defects not detectable before inspection of finished goods. Spoiled units are disposed of at zero net disposal value. WaferCo uses the weighted-average method of process costing.

Summary data for September 2014 are as follows:

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	A	B	C	D
1		Physical Units (Computer Chips)	Direct Materials	Conversion Costs
2	Work in process, beginning inventory (September 1)	1,200	$142,321	$ 16,314
3	Degree of completion of beginning work in process		100%	30%
4	Started during September	2,257		
5	Good units completed and transferred out during September	2,300		
6	Work in process, ending inventory (September 30)	520		
7	Degree of completion of ending work in process		100%	20%
8	Total costs added during September		$573,278	$257,376
9	Normal spoilage as a percentage of good units	15%		
10	Degree of completion of normal spoilage		100%	100%
11	Degree of completion of abnormal spoilage		100%	100%

1. For each cost category, compute equivalent units. Show physical units in the first column of your schedule.
2. Summarize the total costs to account for; calculate the cost per equivalent unit for each cost category; and assign costs to units completed and transferred out (including normal spoilage), to abnormal spoilage, and to units in ending work in process.

Required

18-26 FIFO method, spoilage. Refer to the information in Exercise 18-25.

1. Do Exercise 18-25 using the FIFO method of process costing.
2. Should WaferCo's managers choose the weighted-average method or the FIFO method? Explain briefly.

Required

18-27 Standard-costing method, spoilage. Refer to the information in Exercise 18-25. Suppose WaferCo determines standard costs of $240 per equivalent unit for direct materials and $100 per equivalent unit for conversion costs for both beginning work in process and work done in the current period.

1. Do Exercise 18-25 using the standard-costing method.
2. What issues should the manager focus on when reviewing the equivalent units calculation?

Required

18-28 Spoilage and job costing. (L. Bamber) Barrett Kitchens produces a variety of items in accordance with special job orders from hospitals, plant cafeterias, and university dormitories. An order for 2,100 cases of mixed vegetables costs $9 per case: direct materials, $4; direct manufacturing labor, $3; and manufacturing overhead allocated, $2. The manufacturing overhead rate includes a provision for normal spoilage. Consider each requirement independently.

1. Assume that a laborer dropped 420 cases. Suppose part of the 420 cases could be sold to a nearby prison for $420 cash. Prepare a journal entry to record this event. Calculate and explain briefly the unit cost of the remaining 1,680 cases.
2. Refer to the original data. Tasters at the company reject 420 of the 2,100 cases. The 420 cases are disposed of for $840. Assume that this rejection rate is considered normal. Prepare a journal entry to record this event, and do the following:
   a. Calculate the unit cost if the rejection is attributable to exacting specifications of this particular job.
   b. Calculate the unit cost if the rejection is characteristic of the production process and is not attributable to this specific job.
   c. Are unit costs the same in requirements 2a and 2b? Explain your reasoning briefly.
3. Refer to the original data. Tasters rejected 420 cases that had insufficient salt. The product can be placed in a vat, salt can be added, and the product can be reprocessed into jars. This operation, which is considered normal, will cost $420. Prepare a journal entry to record this event and do the following:
   a. Calculate the unit cost of all the cases if this additional cost was incurred because of the exacting specifications of this particular job.

Required

b. Calculate the unit cost of all the cases if this additional cost occurs regularly because of difficulty in seasoning.
c. Are unit costs the same in requirements 3a and 3b? Explain your reasoning briefly.

18-29 Reworked units, costs of rework. Heyer Appliances assembles dishwashers at its plant in Tuscaloosa, Alabama. In February 2014, 60 circulation motors that cost $110 each (from a new supplier who subsequently went bankrupt) were defective and had to be disposed of at zero net disposal value. Heyer Appliances was able to rework all 60 dishwashers by substituting new circulation motors purchased from one of its existing suppliers. Each replacement motor cost $125.

Required

1. What alternative approaches are there to account for the materials cost of reworked units?
2. Should Heyer Appliances use the $110 circulation motor or the $125 motor to calculate the cost of materials reworked? Explain.
3. What other costs might Heyer Appliances include in its analysis of the total costs of rework due to the circulation motors purchased from the (now) bankrupt supplier?

18-30 Scrap, job costing. The Russell Company has an extensive job-costing facility that uses a variety of metals. Consider each requirement independently.

Required

1. Job 372 uses a particular metal alloy that is not used for any other job. Assume that scrap is material in amount and sold for $480 quickly after it is produced. Prepare the journal entry.
2. The scrap from Job 372 consists of a metal used by many other jobs. No record is maintained of the scrap generated by individual jobs. Assume that scrap is accounted for at the time of its sale. Scrap totaling $4,500 is sold. Prepare two alternative journal entries that could be used to account for the sale of scrap.
3. Suppose the scrap generated in requirement 2 is returned to the storeroom for future use, and a journal entry is made to record the scrap. A month later, the scrap is reused as direct material on a subsequent job. Prepare the journal entries to record these transactions.

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Problems

18-31 Weighted-average method, spoilage. The Seafood Company is a food-processing firm based in Maine. It operates under the weighted-average method of process costing and has two departments: cleaning and packaging. For the cleaning department, conversion costs are added evenly during the process, and direct materials are added at the beginning of the process. Spoiled units are detected upon inspection at the end of the process and are disposed of at zero net disposal value. All completed work is transferred to the packaging department. Summary data for May follow:

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	A	B	C	D
1	**The Seafood Company: Cleaning Department**	**Physical Units**	**Direct Materials**	**Conversion Costs**
2	Work in process, beginning inventory (May 1)	3,600	$ 5,316	$ 1,953
3	Degree of completion of beginning work in process		100%	60%
4	Started during May	30,000		
5	Good units completed and transferred out during May	24,600		
6	Work in process, ending inventory (May 31)	5,040		
7	Degree of completion of ending work in process		100%	30%
8	Total costs added during May		$55,500	$44,659
9	Normal spoilage as a percentage of good units	10%		
10	Degree of completion of normal spoilage		100%	100%
11	Degree of completion of abnormal spoilage		100%	100%

Required

For the cleaning department, summarize the total costs to account for and assign those costs to units completed and transferred out (including normal spoilage), to abnormal spoilage, and to units in ending work in process. (Problem 18-33 explores additional facets of this problem.)

18-32 FIFO method, spoilage. Refer to the information in Problem 18-31.

Required

Do Problem 18-31 using the FIFO method of process costing. (Problem 18-34 explores additional facets of this problem.)

18-33 Weighted-average method, packaging department (continuation of 18-31). In the Seafood Company's packaging department, conversion costs are added evenly during the process, and direct materials are added at the end of the process. Spoiled units are detected upon inspection at the end of the process and are disposed of at zero net disposal value. All completed work is transferred to the next department. The transferred-in costs for May equal the total cost of good units completed and transferred out in May from the cleaning department, which were calculated in Problem 18-31 using the weighted-average method of process costing. Summary data for May follow.

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	A	B	C	D	E
1	**The Seafood Company: Packaging Department**	**Physical Units**	**Transferred-In Costs**	**Direct Materials**	**Conversion Costs**
2	Work in process, beginning inventory (May 1)	12,600	$33,698	$ 0	$23,475
3	Degree of completion of beginning work in process		100%	0%	70%
4	Started during May	24,600			
5	Good units completed and transferred out during May	26,400			
6	Work in process, ending inventory (May 31)	8,400			
7	Degree of completion of ending work in process		100%	0%	40%
8	Total costs added during May		?	$5,760	$40,845
9	Normal spoilage as a percentage of good units	8%			
10	Degree of completion of normal spoilage			100%	100%
11	Degree of completion of abnormal spoilage			100%	100%

For the packaging department, use the weighted-average method to summarize the total costs to account for and assign those costs to units completed and transferred out (including normal spoilage), to abnormal spoilage, and to units in ending work in process. Required

18-34 FIFO method, packaging department (continuation of 18-32). Refer to the information in Problem 18-33 except that the transferred-in costs of beginning work in process on May 1 are $33,090 (instead of $33,698). Transferred-in costs for May equal the total cost of good units completed and transferred out in May from the cleaning department, as calculated in Problem 18-32 using the FIFO method of process costing.

For the packaging department, use the FIFO method to summarize the total costs to account for and assign those costs to units completed and transferred out (including normal spoilage), to abnormal spoilage, and to units in ending work in process. Required

18-35 Physical units, inspection at various levels of completion, weighted-average process costing. SunEnergy produces solar panels. A key step in the conversion of raw silicon to a completed solar panel occurs in the assembly department, where lightweight photovoltaic cells are assembled into modules and connected on a frame. In this department, materials are added at the beginning of the process and conversion takes place uniformly.

At the start of November 2014, SunEnergy's assembly department had 2,400 panels in beginning work in process, which were 100% complete for materials and 40% complete for conversion costs. An additional 12,000 units were started in the department in November, and 3,600 units remain in work in process at the end of the month. These unfinished units are 100% complete for materials and 70% complete for conversion costs.

The assembly department had 1,800 spoiled units in November. Because of the difficulty of keeping moisture out of the modules and sealing the photovoltaic cells between layers of glass, normal spoilage is approximately 12% of good units. The department's costs for the month of November are as follows:

	Beginning WIP	Costs Incurred During Period
Direct materials costs	$ 76,800	$ 240,000
Conversion costs	123,000	1,200,000

1. Using the format on page 715, compute the normal and abnormal spoilage in units for November, assuming the inspection point is at (a) the 30% stage of completion, (b) the 60% stage of completion, and (c) the 100% stage of completion. Required

2. Refer to your answer in requirement 1. Why are there different amounts of normal and abnormal spoilage at different inspection points?
3. Now assume that the assembly department inspects at the 60% stage of completion. Using the weighted-average method, calculate the cost of units transferred out, the cost of abnormal spoilage, and the cost of ending inventory for the assembly department in November.

18-36 Spoilage in job costing. Jellyfish Machine Shop is a manufacturer of motorized carts for vacation resorts.

Patrick Cullin, the plant manager of Jellyfish, obtains the following information for Job #10 in August 2014. A total of 46 units were started, and 6 spoiled units were detected and rejected at final inspection, yielding 40 good units. The spoiled units were considered to be normal spoilage. Costs assigned prior to the inspection point are $1,100 per unit. The current disposal price of the spoiled units is $235 per unit. When the spoilage is detected, the spoiled goods are inventoried at $235 per unit.

Required

1. What is the normal spoilage rate?
2. Prepare the journal entries to record the normal spoilage, assuming the following:
   a. The spoilage is related to a specific job.
   b. The spoilage is common to all jobs.
   c. The spoilage is considered to be abnormal spoilage.

18-37 Rework in job costing, journal entry (continuation of 18-36). Assume that the 6 spoiled units of Jellyfish Machine Shop's Job #10 can be reworked for a total cost of $1,800. A total cost of $6,600 associated with these units has already been assigned to Job #10 before the rework.

Required

Prepare the journal entries for the rework, assuming the following:

a. The rework is related to a specific job.
b. The rework is common to all jobs.
c. The rework is considered to be abnormal.

18-38 Scrap at time of sale or at time of production, journal entries (continuation of 18-36). Assume that Job #10 of Jellyfish Machine Shop generates normal scrap with a total sales value of $700 (it is assumed that the scrap returned to the storeroom is sold quickly).

Required

Prepare the journal entries for the recognition of scrap, assuming the following:

a. The value of scrap is immaterial and scrap is recognized at the time of sale.
b. The value of scrap is material, is related to a specific job, and is recognized at the time of sale.
c. The value of scrap is material, is common to all jobs, and is recognized at the time of sale.
d. The value of scrap is material, and scrap is recognized as inventory at the time of production and is recorded at its net realizable value.

18-39 Physical units, inspection at various stages of completion. Superb Furniture manufactures plastic lawn furniture in a continuous process. The company pours molten plastic into molds and then cools the plastic. Materials are added at the beginning of the process, and conversion is considered uniform through the period. Occasionally, the plastic does not completely fill a mold because of air pockets, and the chair is then considered spoiled. Normal spoilage is 6% of the good units that pass inspection. The following information pertains to March 2014:

Beginning inventory	2,200 units (100% complete for materials; 20% complete for conversion costs)
Units started	21,000
Units in ending work in process	1,900 (100% complete for materials; 70% complete for conversion costs)

Superb Furniture had 1,800 spoiled units in March 2014.

Required

Using the format on page 715, compute the normal and abnormal spoilage in units, assuming the inspection point is at (a) the 15% stage of completion, (b) the 40% stage of completion, and (c) the 100% stage of completion.

18-40 Job costing, rework. Avid Corporation manufactures a sophisticated controller that is compatible with a variety of gaming consoles. Excluding rework costs, the cost of manufacturing one controller is $220. This consists of $120 in direct materials, $24 in direct manufacturing labor, and $76 in manufacturing overhead. Maintaining a reputation for quality is critical to Avid. Any defective units identified at the inspection point are sent back for rework. It costs Avid $72 to rework each defective controller, including $24 in direct materials, $18 in direct manufacturing labor, and $30 in manufacturing overhead.

In August 2014, Avid manufactured 1,000 controllers, 80 of which required rework. Of these 80 controllers, 50 were considered normal rework common to all jobs and the other 30 were considered abnormal rework.

Required

1. Prepare journal entries to record the accounting for both the normal and abnormal rework.
2. What were the total rework costs of controllers in August 2014?
3. Suppose instead that the normal rework is attributable entirely to Job #9, for 200 controllers intended for Australia. In this case, what are the total and unit costs of the good units produced for that job in August 2014? Prepare journal entries for the manufacture of the 200 controllers, as well as the normal rework costs.

18-41 Weighted-average method, inspection at 80% completion. (A. Atkinson) The Horsheim Company is a furniture manufacturer with two departments: molding and finishing. The company uses the weighted-average method of process costing. In August, the following data were recorded for the finishing department:

Units of beginning work in process inventory	25,000
Percentage completion of beginning work in process units	25%
Cost of direct materials in beginning work in process	$ 0
Units started	175,000
Units completed	125,000
Units in ending inventory	50,000
Percentage completion of ending work in process units	95%
Spoiled units	25,000
Total costs added during current period:	
Direct materials	$1,638,000
Direct manufacturing labor	$1,589,000
Manufacturing overhead	$1,540,000
Work in process, beginning:	
Transferred-in costs	$ 207,250
Conversion costs	$ 105,000
Cost of units transferred in during current period	$1,618,750

Conversion costs are added evenly during the process. Direct material costs are added when production is 90% complete. The inspection point is at the 80% stage of production. Normal spoilage is 10% of all good units that pass inspection. Spoiled units are disposed of at zero net disposal value.

Required

1. For August, summarize total costs to account for and assign these costs to units completed and transferred out (including normal spoilage), to abnormal spoilage, and to units in ending work in process.
2. What are the managerial issues involved in determining the percentage of spoilage considered normal? How would your answer to requirement 1 differ if all spoilage were treated as normal?