Chapter 10
Standard Costs and the Balanced Scorecard

Solutions to Questions

10-1 A quantity standard indicates how much of an input should be used to make a unit of output. A price standard indicates how much the input should cost.

10-2 Ideal standards assume perfection and do not allow for any inefficiency. Thus, ideal standards are rarely, if ever, attained. Practical standards can be attained by employees working at a reasonable, though efficient pace and allow for normal breaks and work interruptions.

10-3 Chronic inability to meet a standard is likely to be demoralizing and may result in decreased productivity.

10-4 A budget is usually expressed in terms of total dollars, whereas a standard is expressed on a per unit basis. A standard might be viewed as the budgeted cost for one unit.

10-5 A variance is the difference between what was planned or expected and what was actually accomplished. A standard cost system has at least two types of variances. A price variance focuses on the difference between the standard price and the actual price of an input. A quantity variance is concerned with the difference between the standard quantity of the input allowed for the actual output and the actual amount of the input used.

10-6 Under management by exception, managers focus their attention on results that deviate from expectations. It is assumed that results that meet expectations do not require investigation.

10-7 Separating an overall variance into a price variance and a quantity variance provides more information. Moreover, price and quantity variances are usually the responsibilities of different managers.

10-8 The materials price variance is usually the responsibility of the purchasing manager. The materials quantity and labor efficiency variances are usually the responsibility of production managers and supervisors.

10-9 The materials price variance can be computed either when materials are purchased or when they are placed into production. It is usually better to compute the variance when materials are purchased since that is when the purchasing manager, who has responsibility for this variance, has completed his or her work. In addition, recognizing the price variance when materials are purchased allows the company to carry its raw materials in the inventory accounts at standard cost, which greatly simplifies bookkeeping.

10-10 This combination of variances may indicate that inferior quality materials were purchased at a discounted price, but the low-quality materials created production problems.

10-11 If standards are used to find who to blame for problems, they can breed resentment and undermine morale. Standards should not be used to find someone to blame for problems.

10-12 Several factors other than the contractual rate paid to workers can cause a labor rate variance. For example, skilled workers with high hourly rates of pay can be given duties that require little skill and that call for low hourly rates of pay, resulting in an unfavorable rate variance. Or unskilled or untrained workers can be assigned to tasks that should be filled by more skilled workers with higher rates of pay, resulting in a favorable rate variance. Unfavorable rate

variances can also arise from overtime work at premium rates.

10-13 If poor quality materials create production problems, a result could be excessive labor time and therefore an unfavorable labor efficiency variance. Poor quality materials would not ordinarily affect the labor rate variance.

10-14 If overhead is applied on the basis of direct labor-hours, then the variable overhead efficiency variance and the direct labor efficiency variance will always be favorable or unfavorable together. Both variances are computed by comparing the number of direct labor-hours actually worked to the standard hours allowed. That is, in each case the formula is:

$$\text{Efficiency Variance} = SR(AH - SH)$$

Only the "SR" part of the formula, the standard rate, differs between the two variances.

10-15 A statistical control chart is a graphical aid that helps workers identify variances that should be investigated. Upper and lower limits are set on the control chart. Any variances falling between those limits are considered to be normal. Any variances falling outside of those limits are considered abnormal and are investigated.

10-16 If labor is a fixed cost and standards are tight, then the only way to generate favorable labor efficiency variances is for every workstation to produce at capacity. However, the output of the entire system is limited by the capacity of the bottleneck. If workstations before the bottleneck in the production process produce at capacity, the bottleneck will be unable to process all of the work in process. In general, if every workstation is attempting to produce at capacity, then work in process inventory will build up in front of the workstations with the least capacity.

10-17 A company's balanced scorecard should be derived from and support its strategy. Since different companies have different strategies, their balanced scorecards should be different.

10-18 The balanced scorecard is constructed to support the company's strategy, which is a theory about what actions will further the company's goals. Assuming that the company has financial goals, measures of financial performance must be included in the balanced scorecard as a check on the reality of the theory. If the internal business processes improve, but the financial outcomes do not improve, the theory may be flawed and the strategy should be changed.

10-19 The difference between delivery cycle time and throughput time is the waiting period between when an order is received and when production on the order is started. Throughput time is made up of process time, inspection time, move time, and queue time. These four elements can be classified into value-added time (process time) and non-value-added time (inspection time, move time, and queue time).

10-20 An MCE of less than 1 means that the production process includes non-value-added time. An MCE of 0.40, for example, means that 40% of throughput time consists of actual processing, and that the other 60% consists of moving, inspection, and other non-value-added activities.

10-21 Formal entry tends to give variances more emphasis than off-the-record computations. And, the use of standard costs in the journals simplifies the bookkeeping process by allowing all inventories to be carried at standard, rather than actual, cost.

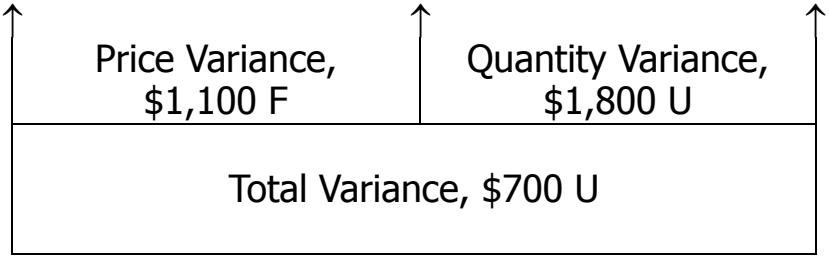
Exercise 10-2 (20 minutes)

1. Number of chopping blocks..... 4,000
   Number of board feet per chopping block ..... × 2.5
   Standard board feet allowed 10,000
   Standard cost per board foot ..... × $1.80
   Total standard cost..... $18,000

   Actual cost incurred $18,700
   Standard cost above..... 18,000
   Total variance—unfavorable ..... $ 700

2.

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
$18,700	11,000 board feet × $1.80 per board foot = $19,800	10,000 board feet × $1.80 per board foot = $18,000



Alternatively:

Materials Price Variance = AQ (AP – SP)
11,000 board feet ($1.70 per board foot* – $1.80 per board foot) = $1,100 F
*$18,700 ÷ 11,000 board feet = $1.70 per board foot.

Materials Quantity Variance = SP (AQ – SQ)
$1.80 per board foot (11,000 board feet – 10,000 board feet) = $1,800 U

Exercise 10-3 (20 minutes)

1.

Number of meals prepared	6,000	
Standard direct labor-hours per meal.....	× 0.20	
Total direct labor-hours allowed	1,200	
Standard direct labor cost per hour	× $9.50	
Total standard direct labor cost.....	$11,400	
Actual cost incurred	$11,500	
Total standard direct labor cost (above)...	11,400	
Total direct labor variance	$ 100	Unfavorable

2.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
1,150 hours × $10.00 per hour = $11,500	1,150 hours × $9.50 per hour = $10,925	1,200 hours × $9.50 per hour = $11,400

Rate Variance, $575 U

Efficiency Variance, $475 F

Total Variance, $100 U

Alternatively, the variances can be computed using the formulas:

Labor rate variance = AH(AR – SR)
= 1,150 hours ($10.00 per hour – $9.50 per hour)
= $575 U

Labor efficiency variance = SR(AH – SH)
= $9.50 per hour (1,150 hours – 1,200 hours)
= $475 F

Exercise 10-8 (20 minutes)

1. The standard price of a kilogram of white chocolate is determined as follows:

Purchase price, finest grade white chocolate	£9.00
Less purchase discount, 5% of the purchase price of £9.00..	(0.45)
Shipping cost from the supplier in Belgium.....	0.20
Receiving and handling cost.....	0.05
Standard price per kilogram of white chocolate	£8.80

2. The standard quantity, in kilograms, of white chocolate in a dozen truffles is computed as follows:

Material requirements	0.80
Allowance for waste	0.02
Allowance for rejects.....	0.03
Standard quantity of white chocolate.....	0.85

3. The standard cost of the white chocolate in a dozen truffles is determined as follows:

Standard quantity of white chocolate (a).....	0.85 kilogram
Standard price of white chocolate (b)	£8.80 per kilogram
Standard cost of white chocolate (a) × (b)...	£7.48

Exercise 10-9 (30 minutes)

1. a. Notice in the solution below that the materials price variance is computed on the entire amount of materials purchased, whereas the materials quantity variance is computed only on the amount of materials used in production.

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
70,000 diodes × $0.28 per diode = $19,600	70,000 diodes × $0.30 per diode = $21,000	40,000 diodes* × $0.30 per diode = $12,000

Price Variance, $1,400 F

50,000 diodes × $0.30 per diode = $15,000

Quantity Variance, $3,000 U

*5,000 toys × 8 diodes per toy = 40,000 diodes

Alternative Solution:

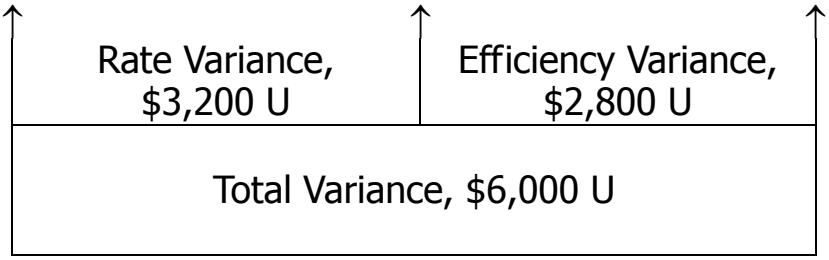
Materials Price Variance = AQ (AP – SP)
70,000 diodes ($0.28 per diode – $0.30 per diode) = $1,400 F

Materials Quantity Variance = SP (AQ – SQ)
$0.30 per diode (50,000 diodes – 40,000 diodes) = $3,000 U

Exercise 10-9 (continued)

b. Direct labor variances:

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$48,000	6,400 hours × $7 per hour = $44,800	6,000 hours* × $7 per hour = $42,000



*5,000 toys × 1.2 hours per toy = 6,000 hours

Alternative Solution:

Labor Rate Variance = AH (AR – SR)
6,400 hours ($7.50* per hour – $7.00 per hour) = $3,200 U
*$48,000 ÷ 6,400 hours = $7.50 per hour

Labor Efficiency Variance = SR (AH – SH)
$7 per hour (6,400 hours – 6,000 hours) = $2,800 U

Exercise 10-9 (continued)

2. A variance usually has many possible explanations. In particular, we should always keep in mind that the standards themselves may be incorrect. Some of the other possible explanations for the variances observed at Topper Toys appear below:

   Materials Price Variance Since this variance is favorable, the actual price paid per unit for the material was less than the standard price. This could occur for a variety of reasons including the purchase of a lower grade material at a discount, buying in an unusually large quantity to take advantage of quantity discounts, a change in the market price of the material, and particularly sharp bargaining by the purchasing department.

   Materials Quantity Variance Since this variance is unfavorable, more materials were used to produce the actual output than were called for by the standard. This could also occur for a variety of reasons. Some of the possibilities include poorly trained or supervised workers, improperly adjusted machines, and defective materials.

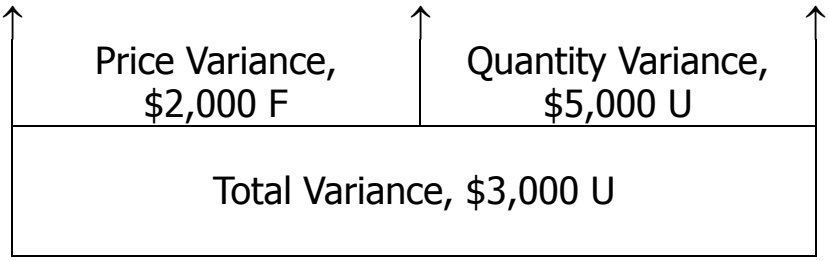
   Labor Rate Variance Since this variance is unfavorable, the actual average wage rate was higher than the standard wage rate. Some of the possible explanations include an increase in wages that has not been reflected in the standards, unanticipated overtime, and a shift toward more highly paid workers.

   Labor Efficiency Variance Since this variance is unfavorable, the actual number of labor hours was greater than the standard labor hours allowed for the actual output. As with the other variances, this variance could have been caused by any of a number of factors. Some of the possible explanations include poor supervision, poorly trained workers, low-quality materials requiring more labor time to process, and machine breakdowns. In addition, if the direct labor force is essentially fixed, an unfavorable labor efficiency variance could be caused by a reduction in output due to decreased demand for the company's products.

Exercise 10-10 (20 minutes)

1.

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
20,000 ounces × $2.40 per ounce = $48,000	20,000 ounces × $2.50 per ounce = $50,000	18,000 ounces* × $2.50 per ounce = $45,000



*2,500 units × 7.2 ounces per unit = 18,000 ounces

Alternatively:

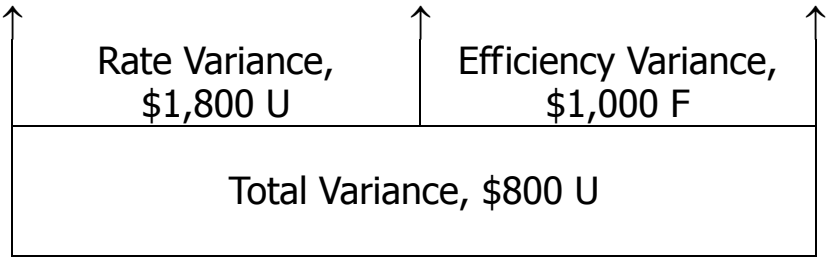
Materials Price Variance = AQ (AP – SP)
20,000 ounces ($2.40 per ounce – $2.50 per ounce) = $2,000 F

Materials Quantity Variance = SP (AQ – SQ)
$2.50 per ounce (20,000 ounces – 18,000 ounces) = $5,000 U

Exercise 10-10 (continued)

2.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$10,800	900 hours × $10 per hour = $9,000	1,000 hours* × $10 per hour = $10,000



*2,500 units × 0.4 hour per unit = 1,000 hours

Alternatively:

Labor Rate Variance = AH (AR – SR)
900 hours ($12 per hour* – $10 per hour) = $1,800 U
*10,800 ÷ 900 hours = $12 per hour

Labor Efficiency Variance = SR (AH – SH)
$10 per hour (900 hours – 1,000 hours) = 1,000 F

Exercise 10-11 (15 minutes)

Notice in the solution below that the materials price variance is computed on the entire amount of materials purchased, whereas the materials quantity variance is computed only on the amount of materials used in production.

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
20,000 ounces × $2.40 per ounce = $48,000	20,000 ounces × $2.50 per ounce = $50,000	14,400 ounces* × $2.50 per ounce = $36,000

Price Variance, $2,000 F

16,000 ounces × $2.50 per ounce = $40,000

Quantity Variance, $4,000 U

*2,000 bottles × 7.2 ounces per bottle = 14,400 ounces

Alternatively:

Materials Price Variance = AQ (AP – SP)
20,000 ounces ($2.40 per ounce – $2.50 per ounce) = $2,000 F

Materials Quantity Variance = SP (AQ – SQ)
$2.50 per ounce (16,000 ounces – 14,400 ounces) = $4,000 U

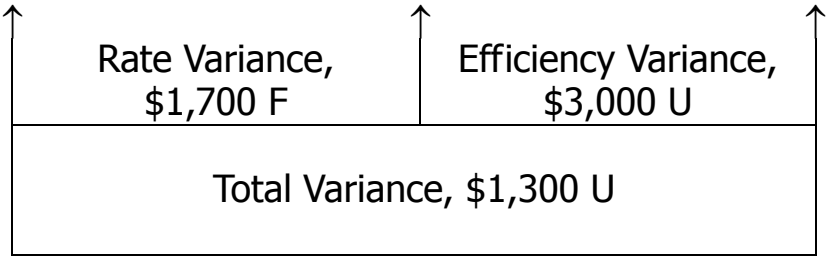
Exercise 10-12 (30 minutes)

1.

Number of units manufactured	20,000
Standard labor time per unit (24 minutes ÷ 60 minutes per hour)	× 0.4
Total standard hours of labor time allowed	8,000
Standard direct labor rate per hour	× $6
Total standard direct labor cost	$48,000
Actual direct labor cost	$49,300
Standard direct labor cost	48,000
Total variance—unfavorable	$ 1,300

2.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$49,300	8,500 hours × $6 per hour = $51,000	8,000 hours* × $6 per hour = $48,000



*20,000 units × 0.4 hour per unit = 8,000 hours

Alternative Solution:

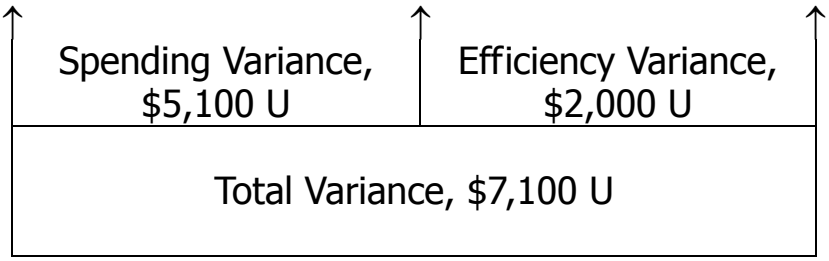
Labor Rate Variance = AH (AR – SR)
8,500 hours ($5.80 per hour* – $6.00 per hour) = $1,700 F
*$49,300 ÷ 8,500 hours = $5.80 per hour

Labor Efficiency Variance = SR (AH – SH)
$6 per hour (8,500 hours – 8,000 hours) = $3,000 U

Exercise 10-12 (continued)

3.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$39,100	8,500 hours × $4 per hour = $34,000	8,000 hours × $4 per hour = $32,000



Alternative Solution:

Variable Overhead Spending Variance = AH (AR – SR)
8,500 hours ($4.60 per hour* – $4.00 per hour) = $5,100 U
*$39,100 ÷ 8,500 hours = $4.60 per hour

Variable Overhead Efficiency Variance = SR (AH – SH)
$4 per hour (8,500 hours – 8,000 hours) = $2,000 U

Problem 10-19 (45 minutes)

1. a. In the solution below, the materials price variance is computed on the entire amount of materials purchased, whereas the materials quantity variance is computed only on the amount of materials used in production:

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
$46,000	8,000 pounds × $6.00 per pound = $48,000	4,500 pounds* × $6.00 per pound = $27,000

Price Variance, $2,000 F

6,000 pounds × $6.00 per pound = $36,000

Quantity Variance, $9,000 U

*3,000 units × 1.5 pounds per unit = 4,500 pounds

Alternatively:

Materials Price Variance = AQ (AP – SP)
8,000 pounds ($5.75 per pound* – $6.00 per pound) = $2,000 F
*$46,000 ÷ 8,000 pounds = $5.75 per pound

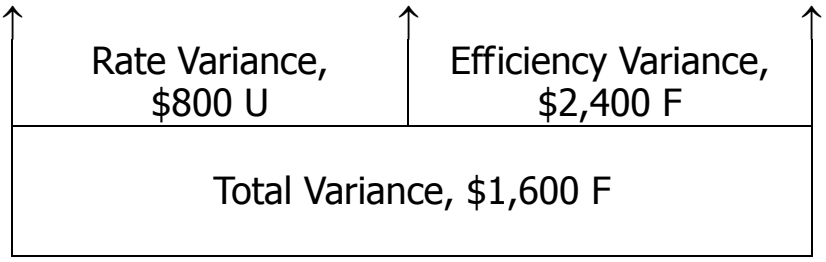
Materials Quantity Variance = SP (AQ – SQ)
$6 per pound (6,000 pounds – 4,500 pounds) = $9,000 U

b. No, the contract should probably not be signed. Although the new supplier is offering the material at only $5.75 per pound, it does not seem to hold up well in production as shown by the large materials quantity variance. Moreover, the company still has 2,000 pounds of unused material in the warehouse; if these materials do as poorly in production as the 6,000 pounds already used, the total quantity variance on the 8,000 pounds of materials purchased will be very large.

Problem 10-19 (continued)

2. a.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
1,600 hours* × $12.50 per hour = $20,000	1,600 hours × $12.00 per hour = $19,200	1,800 hours** × $12.00 per hour = $21,600



* 10 workers × 160 hours per worker = 1,600 hours
** 3,000 units × 0.6 hours per unit = 1,800 hours

Alternatively:

Labor Rate Variance = AH (AR – SR)
1,600 hours ($12.50 per hour – $12.00 per hour) = $800 U

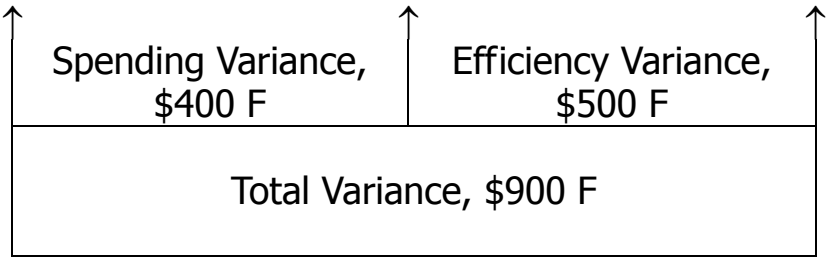
Labor Efficiency Variance = SR (AH – SH)
$12.00 per hour (1,600 hours – 1,800 hours) = $2,400 F

b. Yes, the new labor mix should probably be continued. Although it increases the average hourly labor cost from $12.00 to $12.50, thereby causing an $800 unfavorable labor rate variance, this is more than offset by greater efficiency of labor time. Notice that the labor efficiency variance is $2,400 favorable. Thus, the new labor mix reduces overall labor costs.

Problem 10-19 (continued)

3.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$3,600	1,600 hours × $2.50 per hour = $4,000	1,800 hours × $2.50 per hour = $4,500



Alternatively:

Variable Overhead Spending Variance = AH (AR – SR)
1,600 hours ($2.25 per hour* – $2.50 per hour) = $400 F
*$3,600 ÷ 1,600 hours = $2.25 per hour

Variable Overhead Efficiency Variance = SR (AH – SH)
$2.50 per hour (1,600 hours – 1,800 hours) = $500 F

Both the labor efficiency variance and the variable overhead efficiency variance are computed by comparing actual labor-hours to standard labor-hours. Thus, if the labor efficiency variance is favorable, then the variable overhead efficiency variance will be favorable as well.

Problem 10-22 (30 minutes)

1. Lanolin quantity standard:

Required per 100-liter batch	100 liters
Loss from rejected batches (100 liters × 1/20)	5 liters
Total quantity per good batch	105 liters

Alcohol quantity standard:

Required per 100-liter batch	8.0 liters
Loss from rejected batches (8 liters × 1/20)	0.4 liters
Total quantity per good batch	8.4 liters

Lilac powder quantity standard:

Required per 100-liter batch	200 grams
Loss from rejected batches (200 grams × 1/20)	10 grams
Total quantity per good batch	210 grams

2. Direct labor quantity standard:

Total hours per day	8 hours
Less lunch, rest breaks, and cleanup	2 hours
Productive time each day	6 hours

$$\frac{\text{Productive time each day}}{\text{Time required per batch}} = \frac{\text{6 hours per day}}{\text{2 hours per batch}} = 3 \text{ batches per day}$$

Time required per batch	120 minutes
Lunch, rest breaks, and cleanup (120 minutes ÷ 3 batches)	40 minutes
Total	160 minutes
Loss from rejected batches (160 minutes × 1/20)	8 minutes
Total time per good batch	168 minutes

Problem 10-22 (continued)

3. Standard cost card:

	Standard Quantity or Time per Batch	*Standard Price or Rate*	*Standard Cost per Batch*
Lanolin	105 liters	€16 per liter	€1,680.00
Alcohol	8.4 liters	€2 per liter	16.80
Lilac powder.....	210 grams	€1 per gram	210.00
Direct labor	168 minutes	€0.20 per minute	33.60
Total standard cost per good batch			€1,940.40

Problem 10-27 (45 minutes)

1. a. Materials Price Variance = AQ (AP – SP)
6,000 pounds ($2.75 per pound* – SP) = $1,500 F**
$16,500 – 6,000 pounds × SP = $1,500***
6,000 pounds × SP = $18,000
SP = $3 per pound

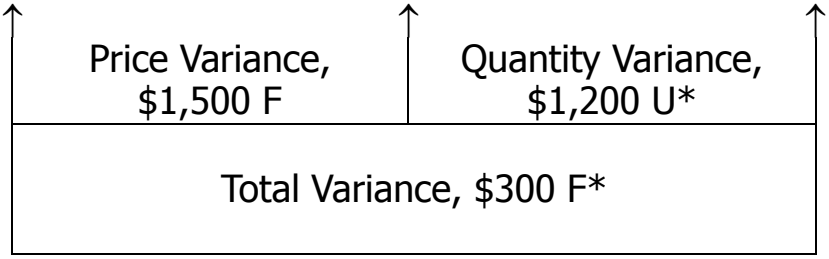
*$16,500 ÷ 6,000 pounds = $2.75 per pound
**$1,200 U + ? = $300 F; $1,200 U – $1,500 F = $300 F.
***When used with the formula, unfavorable variances are positive and favorable variances are negative.

b. Materials Quantity Variance = SP (AQ – SQ)
$3 per pound (6,000 pounds – SQ) = $1,200 U
$18,000 – $3 per pound × SQ = $1,200*
$3 per pound × SQ = $16,800
SQ = 5,600 pounds

*When used with the formula, unfavorable variances are positive and favorable variances are negative.

Alternative approach to parts (a) and (b):

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
$16,500*	6,000 pounds* × $3 per pound = $18,000	5,600 pounds × $3 per pound = $16,800



*Given.

c. 5,600 pounds ÷ 1,400 units = 4 pounds per unit.

Problem 10-27 (continued)

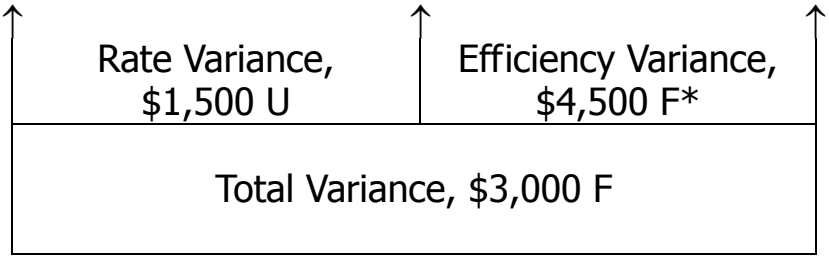
2. a. Labor Efficiency Variance = SR (AH – SH)
\$9 per hour (AH – 3,500 hours*) = \$4,500 F
\$9 per hour × AH – \$31,500 = –\$4,500**
\$9 per hour × AH = \$27,000
AH = 3,000 hours

*1,400 units × 2.5 hours per unit = 3,500 hours
**When used with the formula, unfavorable variances are positive and favorable variances are negative.

b. Labor Rate Variance = AH (AR – SR)
3,000 hours (\$9.50 per hour* – \$9.00 per hour) = \$1,500 U

Alternative approach to parts (a) and (b):

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
3,000 hours × \$9.50 per hour* = \$28,500*	3,000 hours × \$9.00 per hour** = \$27,000	3,500 hours*** × \$9.00 per hour** = \$31,500



* \$28,500 total labor cost ÷ 3,000 hours = \$9.50 per hour
** Given
*** 1,400 units × 2.5 hours per unit = 3,500 hours

Problem 10-28 (75 minutes)

1. a.

Actual Quantity of Inputs, at Actual Price (AQ × AP)	Actual Quantity of Inputs, at Standard Price (AQ × SP)	Standard Quantity Allowed for Output, at Standard Price (SQ × SP)
60,000 feet × $0.95 per foot = $57,000	60,000 feet × $1.00 per foot = $60,000	36,000 feet* × $1.00 per foot = $36,000

Price Variance, $3,000 F

38,000 feet × $1.00 per foot = $38,000

Quantity Variance, $2,000 U

*6,000 units × 6.0 feet per unit = 36,000 feet

Alternative approach:

Materials Price Variance = AQ (AP – SP)
60,000 feet ($0.95 per foot – $1.00 per foot) = $3,000 F

Materials Quantity Variance = SP (AQ – SQ)
$1.00 per foot (38,000 feet – 36,000 feet) = $2,000 U

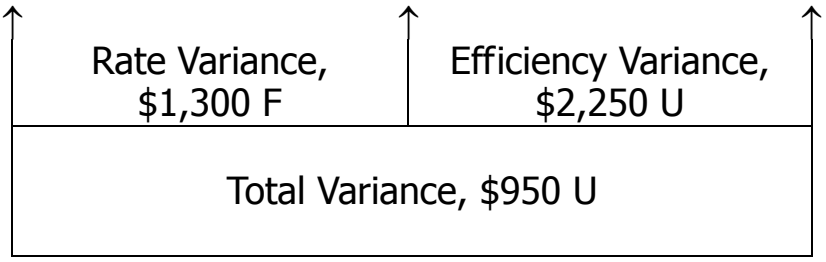
b.

Raw Materials (60,000 feet @ $1.00 per foot)	60,000	
Materials Price Variance (60,000 feet @ $0.05 per foot F)		3,000
Accounts Payable (60,000 feet @ $0.95 per foot).....		57,000
Work in Process (36,000 feet @ $1.00 per foot)	36,000	
Materials Quantity Variance (2,000 feet U @ $1.00 per foot).....	2,000	
Raw Materials (38,000 feet @ $1.00 per foot) ..		38,000

Problem 10-28 (continued)

2. a.

Actual Hours of Input, at the Actual Rate (AH × AR)	Actual Hours of Input, at the Standard Rate (AH × SR)	Standard Hours Allowed for Output, at the Standard Rate (SH × SR)
$27,950	6,500 hours* × $4.50 per hour = $29,250	6,000 hours** × $4.50 per hour = $27,000



*The actual hours worked during the period can be computed through the variable overhead efficiency variance, as follows:

SR (AH – SH) = Efficiency Variance
$3 per hour (AH – 6,000 hours**) = $1,500 U
$3 per hour × AH – $18,000 = $1,500***
$3 per hour × AH = $19,500
AH = 6,500 hours

**6,000 units × 1.0 hour per unit = 6,000 hours

***When used with the formula, unfavorable variances are positive and favorable variances are negative.

Alternative approach:

Labor Rate Variance = AH × (AR – SR)
6,500 hours ($4.30 per hour* – $4.50 per hour) = $1,300 F

*$27,950 ÷ 6,500 hours = $4.30 per hour

Labor Efficiency Variance = SR (AH – SH)
$4.50 per hour (6,500 hours – 6,000 hours) = $2,250 U