Lecture 2: Exercises

15.11 Flexible budget

Abulafia Sri manufactures tyres for the Formula 1 motor racing circuit. For August 2005, Abulafia budgeted to manufacture and sell 3000 tyres at a variable cost of €74 per tyre and a total fixed cost of €54 000. The budgeted selling price was €110 per tyre. Actual results in August 2005 were 2800 tyres manufactured and sold at a selling price of €112 per tyre. The actual total variable costs were €229 600, and the actual total fixed costs were €50 000.

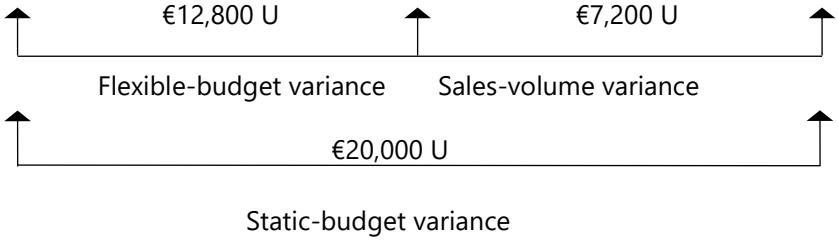
Required:

1. Prepare a performance report that uses a flexible budget and a static budget.
2. Comment on the results in requirement 1.

Suggested Solution

1.

	Actual results	Flexible budget variances	Flexible budget	Sales volume variances	Static budget
	(1)	(2) = (1) − (3)	(3)	(4) = (3) − (5)	(5)
Units sold	2,800	0	2,800	300	3,000
Revenues	€313,600[a]	€5,600 F	€308,000[b]	€48,000 U	€330,000[c]
Variable costs	€229,600[d]	€22,400 U	€207,200[e]	€14,800 F	€222,000[f]
Contribution margin	84,000	16,800 U	100,800	7,200 U	108,000
Fixed costs	50,000[G]	4,000 F	54,000[G]	0	54,000[G]
Operating profit	€34,000	€12,800 U	€46.800	€7,200 U	€54,000



[a] €112 × 2,800 = €313,600.
[b] €110 × 2,800 = €308,000.
[c] € 110 × 3,000 = €330,000.
[d] Given. Unit variable cost = €229,600 ÷ 2,800 = €82 per tyre.
[e] €74 × 2,800 = €207,200.
[f] €74 × 3,000 = €222,000.
[G] Given.

2.

The key information items are:

	Actual	Budgeted
Units	2,800	3,000
Unit selling price	€ 112	€ 40
Unit variable cost	€ 82	€ 74
Fixed costs	€ 50,000	€ 54,000

The total static-budget variance in operating income is €20,000 U. There is both an unfavourable total flexible-budget variance (€12,800) and an unfavourable sales-volume variance (€7,200).
The unfavourable sales-volume variance arises solely because the actual units manufactured and sold were 200 less than the budgeted 3,000 units. The unfavourable static budget of €12,800 in operating income is primarily due to the €8 increase in unit variable costs. This increase in unit variable costs is only partially offset by the €2 increase in selling price and the €4,000 decrease in fixed costs.

15.13 Professional labour variances, efficiency comparisons

Sharmila Khan is manager of TaxExperts.co.uk, a firm that provides assistance in the preparation of individual tax returns via the Internet. Because of the highly seasonal nature of her business, Sharmila employs staff on a monthly basis from two accounting placement firms - Professional Assist (PA) and Office Support (OS). In July 2005, TaxExperts.co.uk took on 12 staff members from PA and 10 from OS. PA is the prestige firm in its area. OS is a recently formed firm.
Sharmila budgets the following for July 2005:

	PA staff	OS staff
Budgeted hourly rate	£45	£40
Budgeted time per tax return in hours	0.40	0.50

Actual results for July 2005 were as follows:

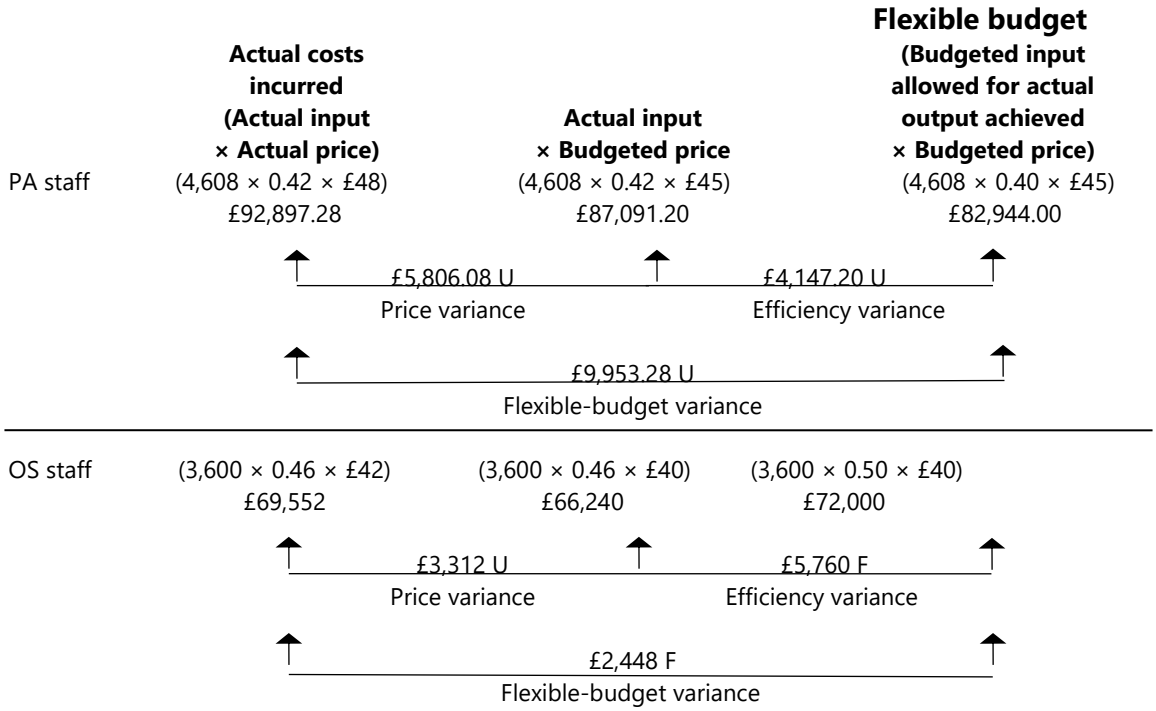
	PA staff	OS staff
Actual hourly rate	£48	£42
Actual time per tax return in hours	0.42	0.46
Number of tax returns completed	4608	3600

Required:

1. Calculate professional labour price and efficiency variances for (a) the 12 PA staff, and (b) the 10 OS staff employed in July 2005.
2. Comment on the efficiency of the PA and OS staff TaxExperts.co.uk employed.
3. What factors other than efficiency might Khan consider in deciding whether to employ staff from PA or OS?

Suggested Solution

1.



2.

The PA staff have an unfavourable efficiency variance of £4,147.20, whereas the OS staff have a favourable efficiency variance of £5,760. Note that variances are calculated relative to budgeted amounts. The PA staff average 0.42 hours per return, whereas the OS staff average 0.46 hours per return. Thus, the PA staff work at a relatively faster rate than the OS staff. However, the PA staff are working at a slower rate than budgeted, whereas the OS staff are working at a faster rate than budgeted.

3.

Factors Khan should consider in addition to efficiency when hiring staff are:

- **a** Competence of their staff to professionally do the tax work.
- **b** Ethical standards of potential staff.
- **c** Hourly rates to be paid. The OS staff have a lower rate per hour. The average cost per tax return completed of the two groups of staff members are:

  PA staff £20.16
  OS staff £19.32.

15.14 Comprehensive variance analysis

AKEI is an elite desk manufacturer. At the start of May 2005, the following budgeted unit amounts (based on a standard costing system) related to its manufacture of executive desks (made out of oak):

Direct materials: 16 square metres of oak per desk at €20 per square metre

Direct manufacturing labour: 3 hours per desk at €30 per direct manufacturing labour-hour

Budgeted production for May 2005 was 700 executive desks. There were no opening stocks of direct materials or finished goods on 1 May 2005. Work in progress is minimal. Actual results for May 2005 are as follows:

Direct materials purchased (12 640 square metres)	€259120
Direct materials used (11850 square metres)	?
Direct manufacturing labour (2325 hours at €31 per hour)	?

Actual production in May 2005 is 750 executive desk units. The purchase price for oak wood remained unchanged throughout May 2005.

Required:

1. Prepare a detailed flexible-budget variance analysis for May 2005 covering direct materials and direct manufacturing labour.
2. Give two explanations for each of the variances you calculate in requirement 1.

Suggested Solution

1.

Direct materials	Actual costs incurred (Actual input × Actual price)	Actual input × Budgeted price	Flexible budget (Budgeted input allowed for actual output achieved × Budgeted price)
Purchase	(12,640 × €20.50) €259,120	(12,640 × €20) €252,800	
	€5,806.08 U Price variance		
Usage		(750 × 15.8 × €20) €237,000	(750 × 16 × €20) €240,000
		€3,000 F Efficiency variance	
Direct Manufacturing Labour	(750 × 3.1 × €31.00) €72,075	(750 × 3.1 × €30.00) €69,750	(750 × 3.0 × €30.00) €67,500
	€2,325 U Price variance		€2,250 U Efficiency variance

2.

Direct materials price variance

(€6,320 U, due to actual price of €20.50 exceeding budgeted price of €20.00.)

- Standard wrongly (unrealistically) set.
- Poor price negotiation.
- Purchase of higher-quality wood.
- Materials price unexpectedly increased due to external shocks (e.g. a natural disaster in major forest areas).
- Purchased in smaller lot sizes than budgeted and did not get quantity discounts.
- Change in supplier when lower-priced supplier went out of business.

Direct materials efficiency variance (€3,000 F, due to actual usage of 15.8 square metres per desk, compared to budgeted 16.0 square metres).

- Standard wrongly (unrealistically) set.
- Increased skills of workers.
- Use of more automated machinery (e.g. laser cutting).

- Workers did more extensive planning and scheduling for materials usage.
- Economies of scale in production.

Direct manufacturing labour price variance (€2,325 U, due to actual rate of €31.00 compared to budgeted €30.00).

- Standard wrongly (unrealistically) set.
- Use of higher-skill mix than budgeted.
- Poor negotiations with labour.
- Overtime may have been necessary to produce the extra 50 desks more than budgeted.
- Unexpected labour shortage due to external factors.

Direct manufacturing labour efficiency variance (€2,250 U, due to actual time being 3.1 hours compared to budgeted 3.0 hours per desk).

- Standard wrongly (unrealistically) set.
- Labour may be less efficient at higher output levels due to tiredness.
- Scheduler assigned less skilled workers to desk production.
- Machine breakdowns required more use of labour.
- Lower-quality wood purchased requiring more labour input to finish desks.

15.15 Flexible budget

The budgeted prices for direct materials, direct manufacturing labour and direct marketing (distribution) labour per attaché case are €40, €8 and €12, respectively. The chairman is pleased with the following performance report:

	Actual costs	Static budget	Variance	
Direct materials	€364 000	€400 000	€36 000	F
Direct manufacturing labour	78 000	80 000	2 000	F
Direct marketing (distribution) labour	110 000	120 000	10 000	F

Required:

1. Actual output was 8800 attached cases. Is the chairman's pleasure justified? Prepare a revised performance report that uses a flexible budget and a static budget. Assume all three direct costs items are variable costs.

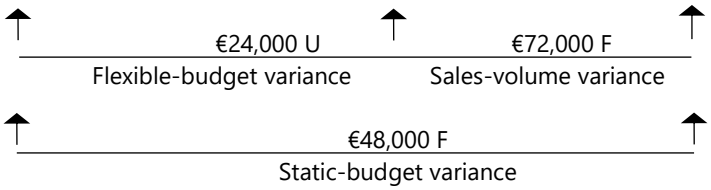
Suggested Solution

1.

The existing performance report is a Level 1 analysis, based on a static budget. It makes no adjustment for changes in output levels. The budgeted output level is 10,000 units – direct materials of €400,000 in the static budget ÷ budgeted direct materials cost per attaché case of €40.

The following is a Level 2 analysis that presents a flexible-budget variance and a sales-volume variance of each direct-cost category:

	Actual results (1)	Flexible-budget variances (2) = (1) − (3)	Flexible budget (3)	Sales-volume variances (4) = (3) − (5)	Static budget (5)
Output units	8,800	0	8,800	1,200 U	10,000
Direct materials	€364,000	€12,000 U	€352,000	€48,000 F	€400,000
Direct manufacturing labour	78,000	7,600 U	70,400	9,600 F	80,000
Direct marketing labour	110,000	4,400 U	105,600	14,400 F	120,000
Total direct costs	€552,000	€24,000 U	€528,000	€72,000 F	€600,000



The Level 1 analysis shows total direct costs have a €48,000 favourable variance. However, the Level 2 analysis reveals that this favourable variance is due to the reduction in output of 1,200 units from the budgeted 10,000 units. Once this reduction in output is taken into account (via a flexible budget), the flexible-budget variance shows each direct-cost category to have an unfavourable variance indicating less efficient use of each direct-cost item than was budgeted.

Each direct-cost category has an actual unit variable cost that exceeds its budgeted unit cost:

	Actual	Budgeted
Units	8,800	10,000
Direct materials	€41.35	€40
Direct manufacturing labour	€ 8.86	€ 8
Direct marketing labour	€12.50	€12

Analysis of price and efficiency variances for each cost category could assist in further identifying the causes of these more aggregated (Level 2) variances.

15.16 Price and efficiency variances

Ched Ltd manufactures Cheddar cheese pies. For January 2005, it budgeted to purchase and use 15 000 kg of Cheddar cheese at £0.89 per kg; budgeted output was 60 000 pies. Actual purchase and use for January 2005 was 16000 kg at £0.82 per kg; actual output was 60 800 pies.

Required:

1. Calculate the flexible-budget variance.
2. Calculate the price and efficiency variances.
3. Comment on the results in requirements 1 and 2.

Suggested Solution

1.
The key information items are:

	Actual	Budgeted
Output units (pies)	60,800	60,000
Input units	16,000	15,000
Cost per input unit	£0.82	£0.89

Ched Ltd budgets to obtain four cheddar cheese pies from every kg of cheddar cheese.
The flexible-budget variance is £408F.

2.

	Actual results (1)	Flexible-budget variances (2) = (1) − (3)	Flexible budget (3)	Sales-volume variances (4) = (3) − (5)	Static budget (5)
Cheddar cheese costs	£13,120[a]	£408 F	£13,528[b]	£178 U	£13,350[c]

[a] 16,000 × £0.82 = £13,120
[b] 60,800 × 0.25 × £0.89 = £13,528
[c] 60,000 × 0.25 × £0.89 = £13,350

3.
The favourable flexible-budget variance of £408 has two offsetting components:

- Favourable price variance of £1,120 – Reflects the £0.82 actual purchase cost being lower than the £0.89 budgeted purchase cost per kg.
- Unfavourable efficiency variance of £712 – Reflects the actual materials yield of 3.80 pies per kg of cheddar cheese (60,800 ÷ 16,000 = 3.80) being less than the budgeted yield of 4.00 (60,000 ÷ 15,000 = 4.00).

One explanation is that Ched purchased lower-quality cheddar cheese at a lower cost per kg.

15.21 Flexible-budget variances for finance function activities

Sam Chase is the Finance Director of Flowers.co.uk, an Internet company that enables customers to order home deliveries of flowers by accessing its website. Flowers.co.uk has a network of florists ('strategic partners') who do the physical delivery of flowers. Flowers.co.uk has a group of representatives that continually visit florists and nurseries. This group monitors product and service quality and explores new products or new partners.
Chase is concerned with the efficiency and effectiveness of the finance function at Flowers.co.uk. He collects the following information for three finance activities in 2004:

Finance activity	Activity measure	Budgeted total cost of activity	Budgeted total volume of activity	Actual cost of process	Actual total volume of activity
Creditors	Number of invoices	£580 000	200 000	£594 020	212 150
Debtors	Number of remittances	639 000	1 000 000	711 000	948 000
Travel and expenses	Number of expense reports	15 200	2 000	13 986	1 890

The budgeted amounts are based on an analysis of costs in past periods at Flowers.co.uk. The output measure is the number of deliveries, which is assumed to be the same as the number of remittances. Debtors is an output-unit-level-driven cost, whereas creditors and travel and expense are batch-driven costs.

Required:

1. Prepare a flexible-budget based report explaining difference between budgeted and actual costs for each of the three finance activities in 2004. Comment on the results.
2. Why might the variances computed in requirement 1 pertain to efficiency but not effectiveness?
3. How might Chase monitor the effectiveness of the three finance processes in this exercise?

Suggested Solution

1

Receivables are an output-level unit-driven activity. The flexible budget number of receivables for the actual output level is 948,000. Payables and travel and expenses are bath-type activities. The flexible-budget-based number of payable invoices and travel and expense reports are:

Payable invoices: = 948,000 × (200,000 ÷ 1,000,000) = 948,000 × 0.20 = 189,600

Travel and expense reports: = 948,000 × (2,000 ÷ 1,000,000) = 948,000 × 0.002 = 1,896

	Actual results	Flexible-budget variance	Flexible budget	Sales-volume variance	Static budget
Payables	(212,150 x £2.80) £594,020		(189,600 x £2.90) £549,840		(200,000 x £2.90) £580,000
		£44,180 U		£30,160 F	
		Flexible-budget variance		Sales-volume variance	
Receivables	(948,000 × £0.75) £711,000		(948,000 × £0.639) £605,772		(1,000,000 x £0.639) £639,000
		£105,228 U		£33,228 F	
		Flexible-budget variance		Sales-volume variance	
Travel and expenses	(1,890 × £7.40) £13,986		(1,896 × £7.60) £14,410		(2,000 × £7.60) £15,200
		£424 F		£790 F	
		Flexible-budget variance		Sales-volume variance	

Comparison of the unit costs per finance activity are:

	Actual cost	Budgeted cost	(Actual cost − Budgeted cost) / Budgeted cost
Payables	£2.800	£2.900	−3.4%
Receivables	0.750	0.639	17.4%

Travel	7.400	7.600	−2.6%

Receivables are an output-level unit-driven activity. The unfavourable flexible-budget variance for receivables reflects the actual cost per remittance (£0.750) exceeding the budgeted amount (£0.639).

The (a) payables, and (b) travel and expense finance activities are batch activities:

	Payables		Travel and expenses	
	Static-budget amounts	**Actual amounts**	**Static-budget amounts**	**Actual amounts**
Number of deliveries	1,000,000	948,000	1,000,000	948,000
Batch size	5.000	4.468	500	501.587
Number of batches	200,000	212,150	2,000	1,890
Cost per activity	£2.90	£2.80	£7.60	£7.40
Total activity	£580,000	£594.020	£152,000	£13,986

The flexible-budget variances can be broken into price and efficiency variances:

Price variance:

= (Actual price of input − Budgeted price of input) × Actual quantity of input

Payables: = (£2.80 − £2.90) × 212,150 = £21,215 F

Receivables: = (£0.750 − £0.639) × 948,000 = £105,228 U

Travel and expenses: = (£7.40 − £7.60) × 1,890 = £378 F

Efficiency variance: $= \left(\begin{matrix}\text{Actual quantity of}\\ \text{input used}\end{matrix} \_ \begin{matrix}\text{Budgeted quantity of input}\\ \text{allowed for actual output}\end{matrix}\right) \times \begin{matrix}\text{Budgeted price}\\ \text{of input}\end{matrix}$

Payables: = (212,150 − 189,600) × £2.90 = £63,395 U

Receivables: = (948,000 − 948,000) × £0.639 = £0

Travel and expenses: = (1,890 − 1,896) × £7.600 = £46 F

Changes in output levels show up as sales-volume variances. When actual volume exceeds the budgeted amount, the sales-volume variance is unfavourable for cost items. The sales-volume variance is favourable when actual output is less than the budgeted amount for cost items. The actual output level (948,000 deliveries/remittances) is less than the budgeted output level (1,000,000 deliveries/remittances). Hence, the sales-volume variance for costs is favourable for each of the three finance activities.

2.

Efficiency measures the relative amount of inputs used to achieve a given level of output. Effectiveness measures the degree to which a predetermined objective or target is met. The variances do not examine the extent to which the finance activities help Flowers.co.uk achieve its objective(s). Suppose this objective is to maximise operating income. Chase would want to examine how, say, changes in the cost of processing travel visit reimbursements affect operating income. For example, what is the effect of delays or errors in processing travel reimbursements?

3.

Effectiveness could be examined by having operating managers evaluate the contribution of the individual finance activities to assisting them attain Flowers.co.uk's objectives. For example, travelling representatives could evaluate how their field activities are helped or hindered by the expense report requirements and procedures of the finance function.

15.22 Finance function activities, benchmarking

Sam Chase of Flowers.co.uk receives a brochure from the Hackett Group, a consulting firm specialising in benchmarking. He asks the Hackett Group to provide benchmark data from its recent study of the finance function at over 100 retail companies (both traditional retail and

Internet-based retail). Hacketts' 'world-class' cost benchmarks for Flowers.co.uk's three finance activities are:

Finance activity	World-class cost performance
Creditors	£0.71 per invoice
Debtors	£0.10 per remittance
Travel and expenses	£1.58 per expense report

Required:

1. What new insights might arise with the Hackett benchmark data using the budgeted amounts in Exercise 15.21?
2. Assume you are in charge of travel and expense report processing. What concerns might you have with Sam Chase using the Hackett benchmark of £1.58 per expense report as the key to evaluate your performance next period?

Suggested Solution

1.

The Hackett benchmark data are attention-directing inputs. The key new insight is how Flowers.co.uk compares with world-class organisations. At face value, there is much room for improvement. The per unit cost differences are dramatic:

	Flowers.co.uk		
	2004 Budgeted	**2004 Actual**	**World-class cost performance**
Payables	£2.900	£2.80	£0.71 per invoice
Receivables	0.639	0.75	0.10 per remittance
Travel	7.600	7.40	£1.58 per expense report

2.

Chase should first examine whether there is an 'apples to apples' comparison with these figures. Are costs of the finance department activities measured in the same way in Flowers.co.uk and the company with 'world-class cost performance'? Is the unit of activity measured the same? Suppose Flowers.co.uk allocates other costs into the finance area (such as the Chairman's salary), while the £1.58 per expense report figure is for finance department costs only. Will Chase either adjust the £1.58 figure upwards or exclude non-finance department costs in Flowers.co.uk's cost figures?

Chase should also gain information on why the large cost differences occur. For example, is it because the 'world-class performer' is more aggressive in using new technology in the finance area? For example, some companies are reducing financing department costs by the use of web-based reporting procedures. A related issue is whether Chase is willing to invest in new technologies in the same way that world-class finance function organisations do. If not, then the £1.58 benchmark could be unattainable, no matter how well the travel expense reporting group performs.

16.22 Comprehensive review of Chapters 15 and 16, flexible budget

Madetoja Oy's job-costing system has two direct-cost categories: direct materials and direct manufacturing labour. Manufacturing overhead (both variable and fixed) is allocated to products on the basis of standard direct manufacturing labour-hours (DLH). At the beginning of 2005, Madetoja adopted the following standards for its manufacturing costs:

	Input	Cost per output unit
Direct materials	3 kg at €5.00 per kg	€15.00
Direct manufacturing labour	5 hours at €15.00 per hour	75.00
Manufacturing overhead		
Variable	€6.00 per DLH	30.00
Fixed	€8.00 per DLH	40.00
Standard manufacturing cost per output unit		€160.00

The denominator level for total manufacturing overhead per month in 2005 is 40 000 direct manufacturing labour-hours. Madetoja's flexible budget for January 2005 was based on this denominator level. The records for January indicate the following:

Direct materials purchased	25 000 kg at €5.20 per kg
Direct materials used	23100 kg
Direct manufacturing labour	40100 hours at €14.60 per hour
Total actual manufacturing overhead (variable and fixed)	€600 000
Actual production	7800 output units

Required:

1 Prepare a schedule of total standard manufacturing costs for the 7800 output units in January 2005.

2 For the month of January 2005, calculate the following variances, indicating whether each is favourable (F) or unfavourable (U):
- a Direct materials price variance, based on purchases
- b Direct materials efficiency variance
- c Direct manufacturing labour price variance
- d Direct manufacturing labour efficiency variance
- e Total manufacturing overhead spending variance
- f Variable manufacturing overhead efficiency variance
- g Production-volume variance.

Suggested Solution

1.

Total standard production costs are based on 7,800 units of output.

Direct materials, 7,800 × €15.00 (or 7,800 × 3 kg × €5.00 or 23,400 kg × €5.00)	117,000
Direct manufacturing labour, 7,800 × €75.00 (or 7,800 × 5 hours × €15.00 or 39,000 hours × €15.00)	585,000
Manufacturing overhead:	
Variable, 7,800 × €30.00 (or 39,000 hours × €6.00)	234,000

Fixed, 7,800 × €40.00 (or 39,000 hours × €8.00)	312,000
Total	1,248,000

The following is for later use:

Fixed manufacturing overhead, a lump-sum budget	€320,000*

*Fixed manufacturing overhead rate =

$$€8.00 = \frac{\text{Budget}}{40{,}000\,\text{hours}}$$

Budget = 40,000 hours × €8.00 = €320,000

2

3-variance analysis	Spending variance	Efficiency variance	Production-volume variance
Total manufacturing overhead	€39,400 U	€6,600 U	€8,000 U

	Actual costs incurred (Actual input × Actual rate)	(Actual input × Budgeted price) Purchases	Usage	Flexible budget (Budgeted input allowed for actual output achieved × Budgeted price)
Direct materials	(25,000 × €5.20) €130,000	(25,000 × €5.00) €125,000	(23,100 × €5.00) €115,500	(23,400 × €5.00) €117,000
		€5,000 U a. Price variance	€1,500 F b. Efficiency variance	
Direct manufacturing labour	(40,100 × €14.60) €585,460	(40,100 × €15.00) €601,500		(39,000 × €15.00) €585,000
		€16,040 F c. Price variance	€16,500 U d. Efficiency variance	

	Actual costs incurred	Actual input × Budgeted rate	Flexible budget (Budgeted input allowed for actual output achieved × Budgeted rate)	Allocated: (Budgeted input allowed for actual output achieved × Budgeted rate)
Variable manufacturing overhead	(not given)	(40,100 × €6.00) €240,600	(39,000 × €6.00) €234,000	
		€6,600 U Efficiency variance		
Fixed manufacturing overhead	(not given)	€320,000	€320,000	(39,000 × €8.00) €312,000

			Never a variance	€8,000 U* Production-volume variance
Total manufacturing overhead	(given) €600,000	(€240,600 + €320,000) €560,600	(€234,000 + €320,000) €554,000	(€234,000 + €312,000) €546,000
		€39,400 U e. Spending variance	€6,600 f. Efficiency variance	€8,000 U g. Production-volume variance

*Denominator level in hours 40,000
Production volume in standard hours allowed 39,000
Production-volume variance 1,000 hours X €8.00 = €8,000 U