**Decision-making: methods and tools**

**Management Accounting**

*Operation Costing*

The TEX Company, located in the north of Italy, produces and sells high-quality fabrics. The productive cycle is composed by 5 phases: weaving, washing, dyeing, moulding, finishing.

The activity of weaving takes place by using 10 looms and the washing phase removes the impurities of the textile once the weaving phase is completed.

After these two phases, the fabric may follow three alternate paths:

1. It goes to the dyeing phase
2. It goes to the moulding phase
3. It goes first to the dyeing phase and then to the moulding one

Independently from the three paths, the fabric passes the finishing phase.

With respect to the month of October, the following data were collected:

* three types of fabric have been realized: 40.000 meter of white printed fabric (S), 30.000 meter of dyed fabric (T) and 25 meter of dyed printed fabric (TS);
* Time required for the weaving phase is the same for T, S and TS (1min);
* Time required for washing phase is 30 second for S and 1 minute for T and TS;
* Time required for the dyeing phase is directly proportional to meters dyed;
* Time required for the moulding phase is independent both from the type of print and from the sketch;
* Time required for the finishing phase is different: 2 min/m for S, 3 min/m for T and 4 min/m for TS;
* Cost of energy is the following: 10,1 k€ for the weaving phase, 7 k€ for the washing phase, 5 k€ for the dyeing phase, 8 k€ for the moulding phase and 10 k€ for the finishing phase;
* The cost of raw material for T, S and TS is 5 €/m;
* In the washing phase some additives are necessary and related cost is di 6 k€;
* In the moulding phase three rolls were used (cost 3 k€/roll) and the cost od additives in this phase is 4 k€;
* In the dyeing phase the total cost of additives used is 7,1 k€
* In the finishing phase the total cost of additives is 4,8 k€.

You also have the following information:

* In the weaving phase there are 5 direct workers and 1 supervisor;
* In the washing phase there are two specialized workers;
* In the dyeing phase there is only one specialized worker;
* In the moulding phase there are 2 direct workers and 1 supervisor;
* In the finishing phase there are 2 direct workers
* The annual cost of personnel is 30 k€/worker for direct worker and 42 k€ /worker for both supervisor and specialized worker
* Annual depreciation is reported in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Weaving** | **Washing** | **Dyeing** | **Moulding**  | **Finishing** |
| Annual Depr. | 12 k€ /loom | 30 k€  | 24 k€  | 36 k€  | 30 k€  |

Please determine:

1. The unitary full cost of each product
2. The value of final inventories (raw material, WIP and finished goods), the gross profit by knowing that:
* For the valorization of inventories the TEX uses the FIFO logic
* At the beginning of October initial inventories are the following:
* Product T, total value 60,5 k€ (u.f.c. 6,050 €/ meter)
* Raw material, total value 80 k€
* During this month, the company bought raw material, total value 430 k€
* In October the company sold the following quantity of products:
* 35.000 m of S, price 6,9 € /m
* 25.000 m of T, price 7,2 € /m
* 22.000 m of TS, price 8,1 € /metro

3. What would change in case the Company uses the LIFO logic?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Weaving | Washing | Dyeing | Moulding | Finishing |
| S | X | X |  | X | X |
| T | X | X | X |  | X |
| TS | X | X | X | X | X |

Cost of Direct material= 5€/met

1. Identification of CONVERSION COSTS for each operation

WEAVING= energy + labor + depreciation= 10,1+ (2,5\*5) + 3,5 + (10\*12/12)= **36,1** **k€**

WASHING= energy + OVH + labor + depreciation= 7+ 6 + (3,5\*2) + (30/12)= **22,5 k€**

DYEING= energy + OVH + labor + depreciation= 5+ 7,1+ 3,5 + (24/12)= **17,6 k€**

MOULDING= energy + OVH + labor + depreciation= 8 + (3\*3) + 4+ (2,5\*2) + 3,5 + (36/12)= **32,5 k€**

FINISHING= energy + OVH + labor + depreciation= 10 + 4,8 + (3,5\*2) + (30/12)= **24,3** **k€**

1. Identification of the ALLOCATION BASE (i.e. time and n. of meters) for each operation

S= 40.000met; T=30.000met; TS= 25.000met

WEAVING= 40.000 + 30.000 + 25.000= 95.000 min

 95.000min 36,1 k€/95.000min = **0,38****€/min**

WASHING= (40.000\*0,5) + 30.000 + 25.000= 75.000 min

 75.0000min/22,5 k€= **0,3€/min**

DYEING= 30.000 + 25.000= 55.000 min

 55.000 min/17,6 k€= **0,32€/min**

MOULDING= 40.000 + 25.000= 65.000 min

 65.000 min/32,5 k€= **0,5€/min**

FINISHING= (2\*40.000) + (3\*30.000) + (4\*25.000)= 270.000 min

 270.000 min/24,3 k€= **0,09€/min**

1. Identification of the Unitary Full Cost

S= 5 + 0,38 + (0,3\*0,5) + 0,5 + (0,09\*2)= **6,210 €/met**

T= 5 + 0,38 + 0,3 + 0,32 + (0,09\*3)= **6,270 €/met**

TS= 5 + 0,38 + 0,3 + 0,32 + (0,09\*4)= **6,860 €/met**

1. Value of final inventories

Direct material= 80 + 430 – [5\*(40.000 + 30.000 + 25.000)] = **35 k€**

Final inventories of finished goods

S= 40.000 – 35.000= 5.000\*6,210= **31,05 k€**

T= (30.000 - 15.000)= 15.000\*6,270= **94,05 k€**

TS= 25.000 – 22.000= 3.000\*6,860= **20,58 k€**

Tot value= **145,68 k€**

1. Gross profit

Sales= (35.000\*0,9) + (25.000\*7,2) + (22.000\*8,1)= **599,7 k€**

Cost of sale= (35.000\*6,210) + (10.000\*6,050) + (15.000\*6,270) + (22.000\*6,860)= **522,82** **k€**

Gross profit= 599,7 - 522,82 = 76,88 k€

1. LIFO criteria

Final inventories of T

(10.000\*6,050) + (5.000\*6,270) = **91,85 k€**

Cost of sales= (35.000\*6,210) + (25.000\*6,270) + (22.000\*6,860)= **525, 02** **k€**

Gross profit= 599,7 - - 525,02= 74,68 **k€**