ECA CASE: INFRARED LAMPS PRODUCTION

The purpose of this case is to become acquainted with the ECA tables. You will learn how to fill in the tables and how to calculate the primary energy contents of the energy carriers.

What is not practised is the inventory of company data. These data are given. Filling in the tables can be done much more quickly in this case than in practice.

Assignment

Fill in the blank ECA tables of this exercise on the basis of the data provided through the inventory of company data.

INVENTORY OF COMPANY DATA

1 PRODUCTION PROCESS AND BUILDINGS

Product	Infrared lamps
Production process	Production of ceramics, followed by assembly

A plan of the factory site is given in figure 1 on the following page. On the basis of this, the accommodation is allocated as follows:

Building	**Activity**	**Surface**
Building A	Ceramics	12,000 m^2
	Assembly	8,000 m^2
Building B	Offices	2,000 m^2
Building C	Storage	10,000 m^2
Building D	Utilities	size irrelevant

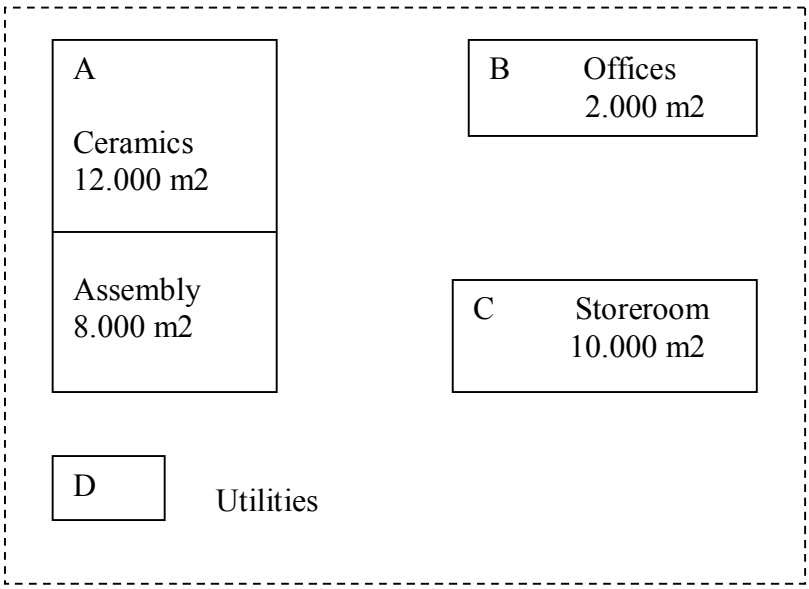

fig. 1 Factory site

Figure 2 shows the process steps for manufacturing the infrared lamps. The two main processes are “Ceramics” and “Assembly”.

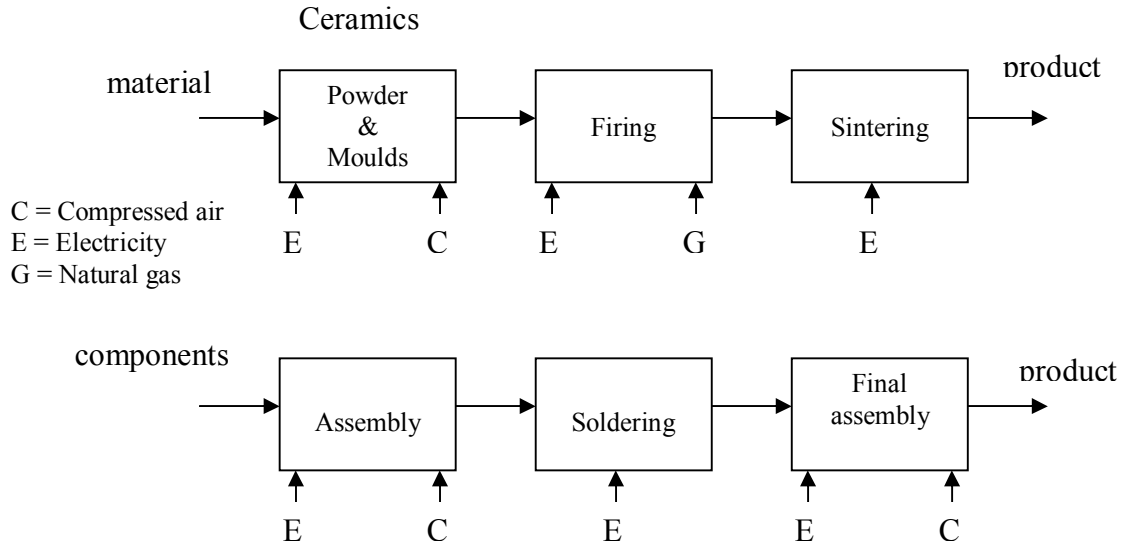

fig. 2 Process steps

2 ENERGY NETWORKS

The structure of the information used in the ECA depends on the energy consumption of the relevant production units and the metering. Figure 3 depicts the electrical meter network, figure 4 shows the structure of the metering of natural gas and figure 5 the compressed air network.

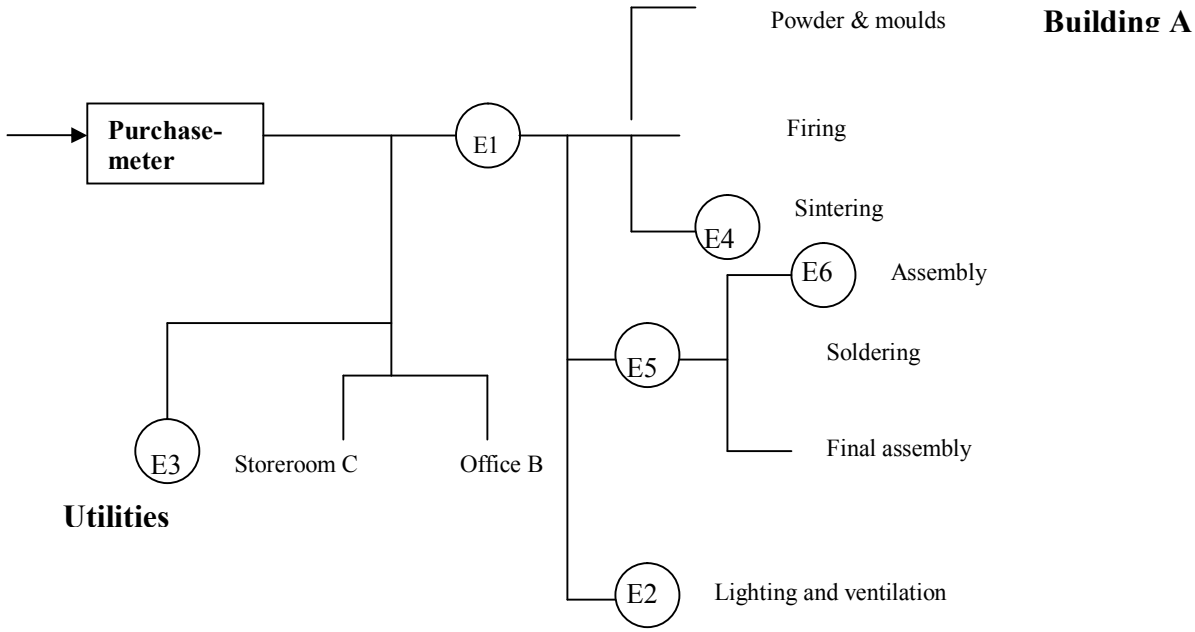

fig. 3 Electrical network of the plant

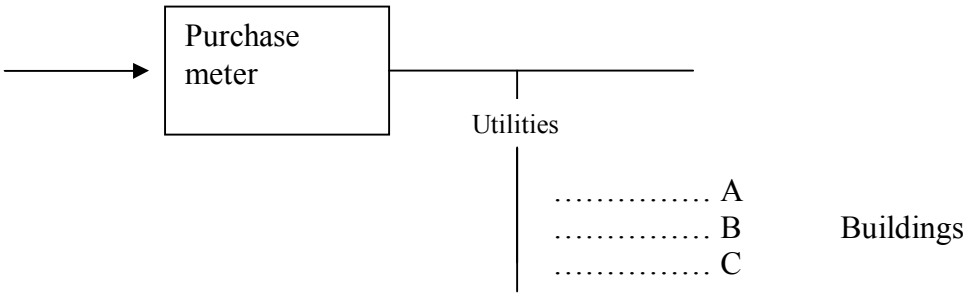

fig. 4 *Natural gas meter network*

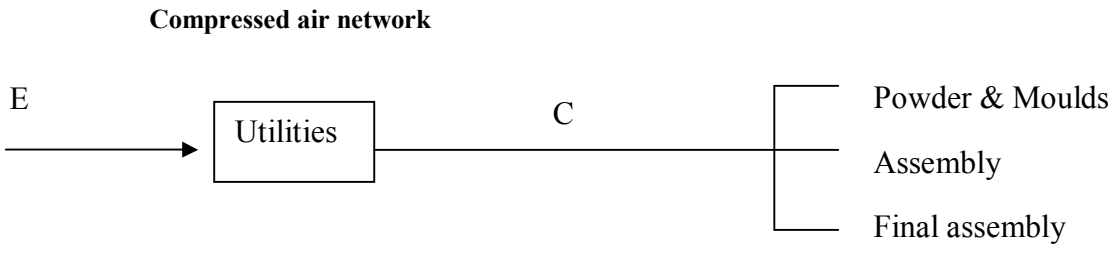

fig. 5 *Compressed air network*

3 ENERGY CONSUMPTION DATA

The following consumption data are available.

Production:
Ceramics (Firing) Two 5 kW extraction fans and 5.000 working hours

Accommodation:
Buildings Building A 6 fans of 21 kW and 5.000 working hours
Building B installed lighting 20 W/m^2 (2.000 m^2), 1.500 working hours
office equipment on the basis of power and working time 120.000 kWh.

Utilities:
Pumps: power rating 8 kW, working time of 4.000 hours
Hot water production: boiler efficiency 65 %
Compressed air: Divided over the process steps according to machine data: 30% for Assembly, 70% for Powder and moulds

table 1: *Energy data for* a whole year, *taken from invoices and energy meters (see electrical network)*

Electricity	**MWh**
Main meter (purchase)	7.730
E1	6.260
E2	1.320
E3	910
E4	4.100
E5	450
E6	120

table 2: *See natural gas network:*

Natural gas	1000 m^3
Main meter (purchase)	1.410
A1 (firing)	620